

## **Historic, Archive Document**

Do not assume content reflects current  
scientific knowledge, policies, or practices.



# FLOOD PLAIN MANAGEMENT STUDY GLENWOOD CITY VILLAGE OF DOWNING VILLAGE OF BOYCEVILLE DUNN & ST. CROIX COUNTIES, WISCONSIN



PREPARED BY THE  
UNITED STATES DEPARTMENT OF AGRICULTURE ,  
SOIL CONSERVATION SERVICE ,  
MADISON, WISCONSIN  
IN COOPERATION WITH  
DUNN COUNTY, WISCONSIN  
ST. CROIX COUNTY, WISCONSIN  
AND THE  
WISCONSIN DEPARTMENT OF NATURAL RESOURCES  
APRIL 1984

AD-33 Bookplate  
(1-68)

**NATIONAL**

**A  
G  
R  
I  
C  
U  
L  
T  
U  
R  
A  
L**



**LIBRARY**



## Table of Contents

	<u>Page</u>
Introduction	1
Study Area Description	1
Vicinity Map	2
Natural and Beneficial Flood Plain Values	4
Flooding Problems	4
Existing Flood Plain Management	4
Alternatives for Mitigating Flood Damages to Existing and Future Development	5

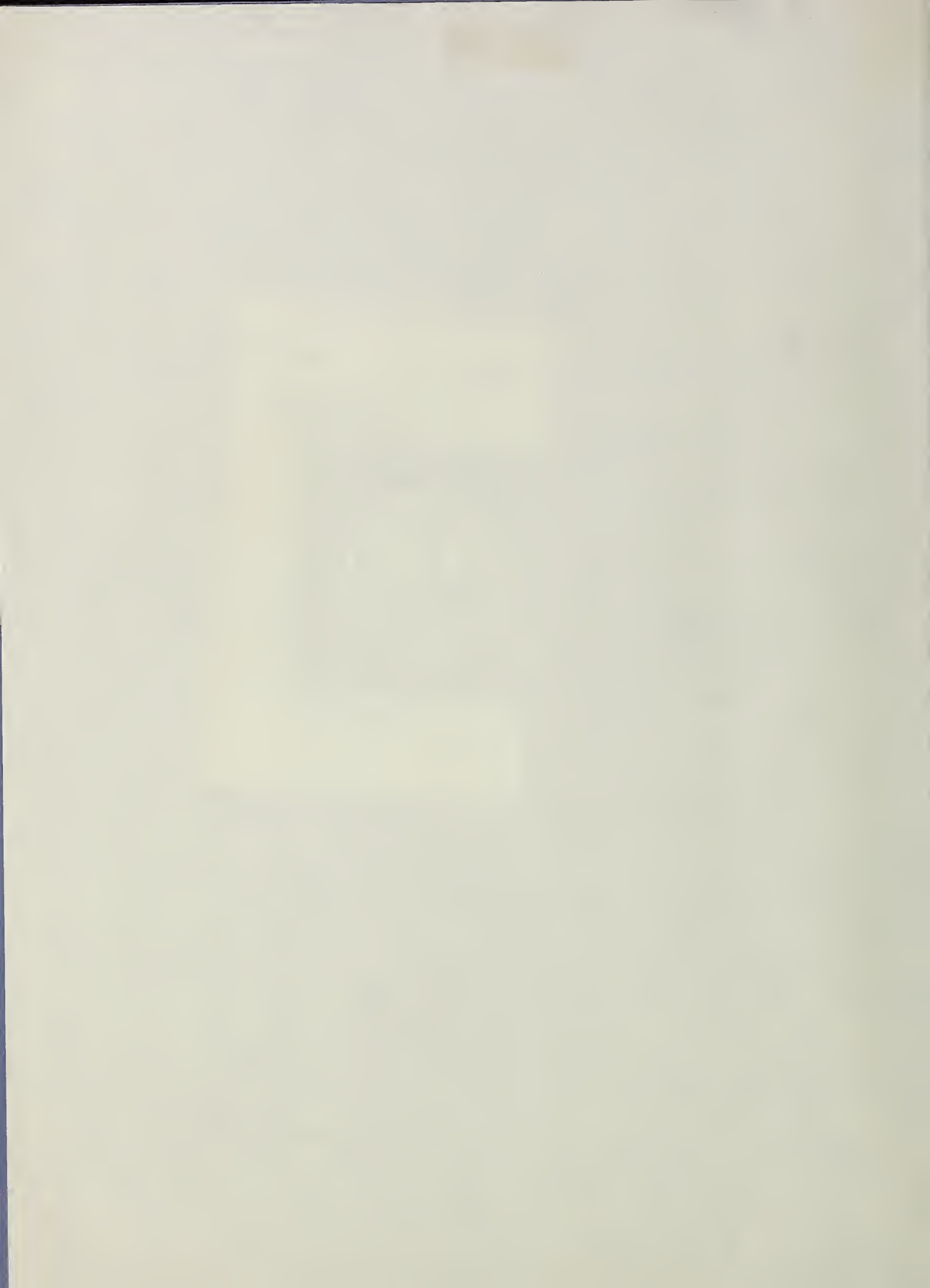
## Appendices

- A. Flood Boundary Maps
  - 1. Flood Boundary Index Map
- B. Flood Profiles
- C. Typical Sections
- D. Bench Marks
- E. Tabulation of Water Surface Elevations and Discharges
- F. Floodway Data
- G. Investigations and Analysis
- H. Glossary
- I. Bibliography

U. S. DEPT. OF AGRICULTURE  
NATIONAL AGRICULTURAL LIBRARY

OCT 11 1984

CATALOGING = P. R. P.



Glenwood City, Downing, Boyceville,  
Dunn County and St. Croix County  
Flood Hazard Study

### Introduction

The purpose of this study is to define the flood characteristics of Tiffany and Beaver Creeks in Glenwood City, Downing, and Boyceville in Dunn and St. Croix Counties. The study was requested through the Dunn and St. Croix Counties and the Wisconsin Department of Natural Resources (DNR). The information acquired will enable them to develop an effective flood plain management program.

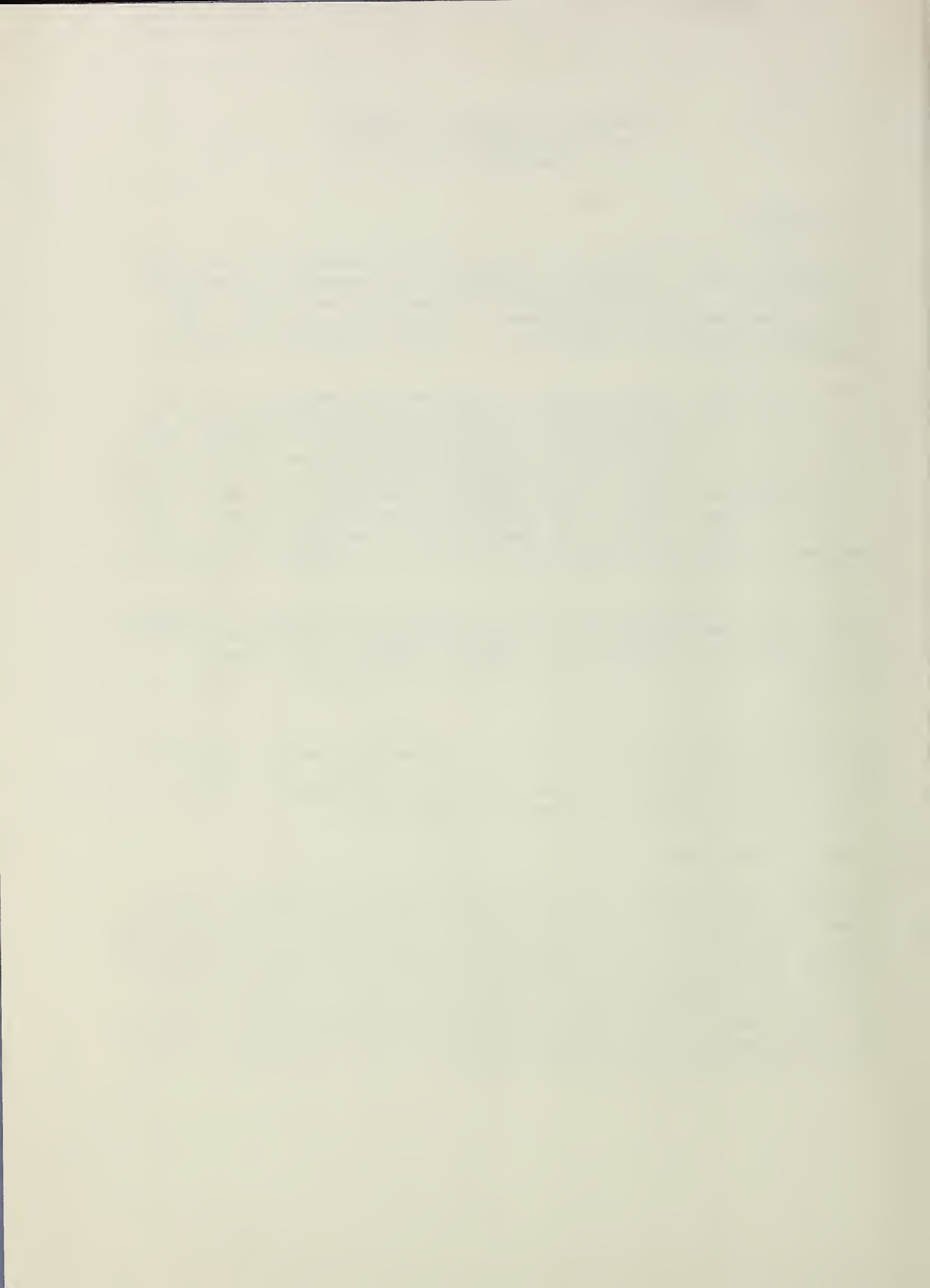
Tiffany and Beaver Creeks are part of the Glen Hills watershed, a PL-566 project where the last floodwater retarding structure was completed in the fall of 1975. The watershed has a limited term structure maintenance agreement and there is a possibility the structures could be removed in the future. It was agreed to use the 100-year frequency flood plain with the dams in place as the regulated floodway and the additional flood plain required to carry the 100-year frequency flood with the structures removed as the regulated flood fringe. The report contains the floodway and the two flood plains on the photomaps, profiles, and charts except for the two tributaries in Boyceville which show the 100-year flood plain.

The Soil Conservation Service carries out flood hazard studies in accordance with Federal Level Recommendation 3 of "A Unified National Program for Flood Plain Management," and Section 6 of Public Law 83-566. The principles contained in Executive Order 11988, Flood Plain Management, are addressed in this part.

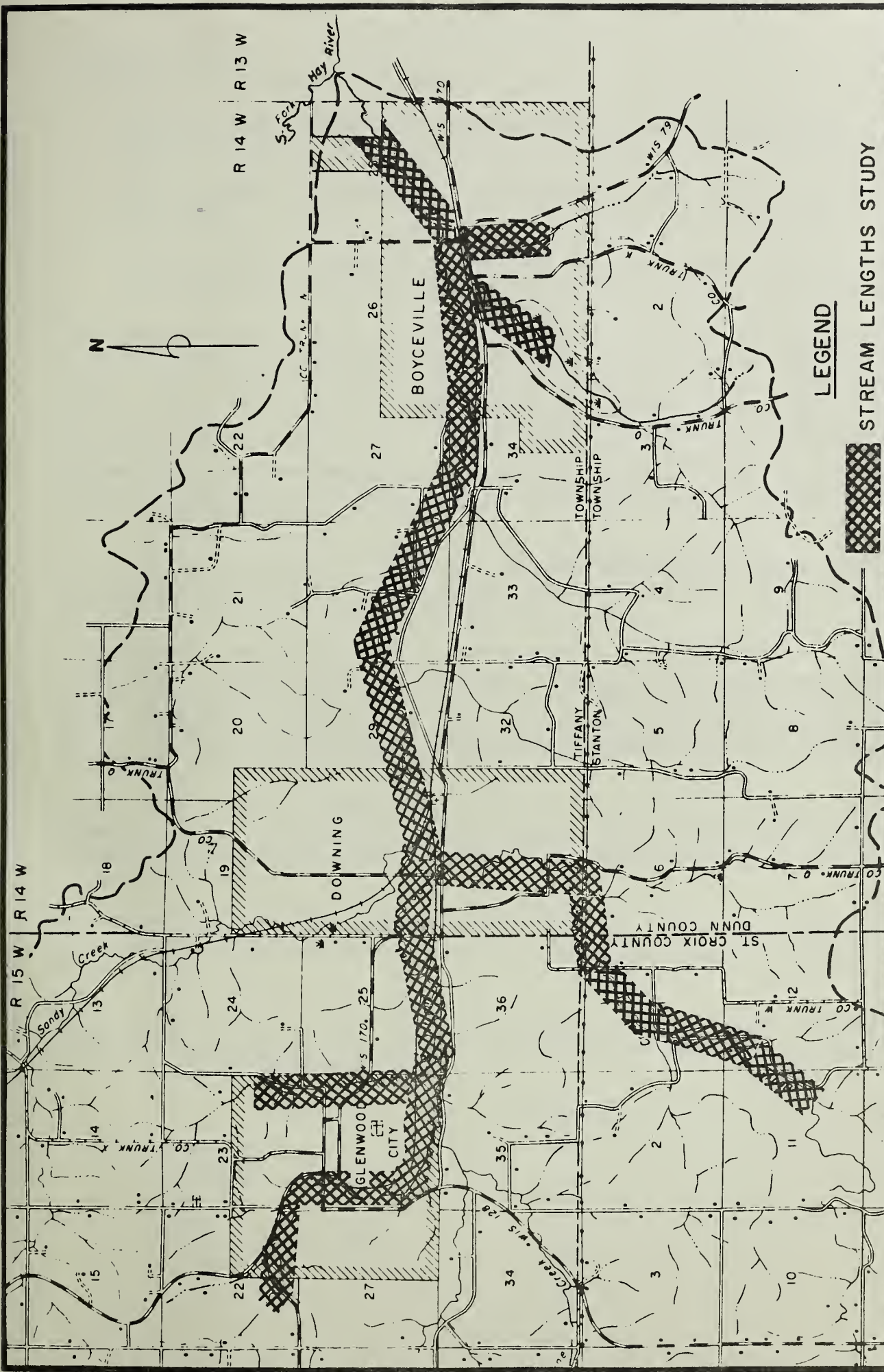
In Wisconsin the Soil Conservation Service coordinates flood hazard studies with the Wisconsin DNR, through a joint coordination agreement entered into in October 1978. The Wisconsin Water Resources Act (Chapter 614, Laws of Wisconsin, 1965) authorizes the DNR, Division of Enforcement, to establish and upgrade minimum standards for flood plain regulations.

### Study Area Description


The study area is in Dunn and St. Croix Counties in west-central Wisconsin. The watershed is fan-shaped and about equally divided into three tributary areas: Beaver Creek in the south, Tiffany Creek in the west, and Sandy Creek in the north. The confluence of these streams is at Downing, a village at the Dunn-St. Croix county line. Beaver Creek has two flood retarding structures of which one is a multi-purpose structure which forms Glen Lake. Tiffany Creek has six floodwater retarding structures above the confluence of Beaver and Sandy Creeks of which three are directly above Glenwood City. Sandy Creek has two floodwater retarding structures and one natural impoundment (Bushy Lake) outletted through a railroad culvert.







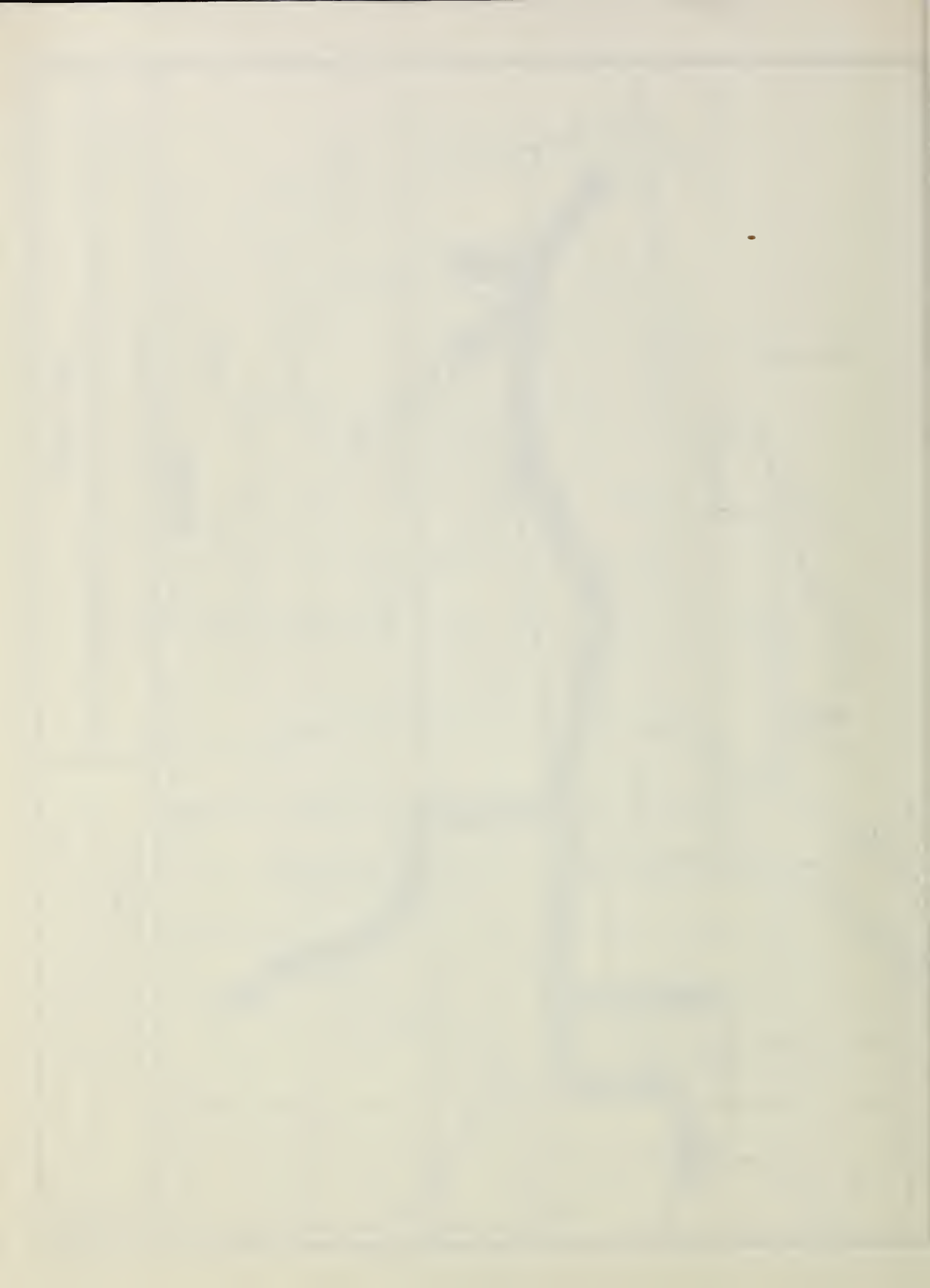
**LEGEND**

 **STREAM LENGTHS STUDY**



U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE  
 Glenwood City, Downing and Boyceville  
 Flood Hazard Study  
 St. Croix & Dunn Co's., Wisconsin

**FIGURE 1**





The following reaches were studied:

Tiffany Creek from site 5 above Glenwood City to the downstream city limits of Boyceville, 14.41 miles.

Beaver Creek from Glen Lake to its confluence with Tiffany Creek, 6.07 miles.

Glenhaven Creek to site 6, 1.14 miles, Boyceville West drainageway, 0.74 miles and Boyceville East drainageway, 0.65 miles.

The combined drainage area below structures 4 and 5, Upper Tiffany Creek, is 2.8 square miles. Tiffany Creek at Downing has a drainage area of 17.02 square miles. Beaver Creek at Downing has a drainage area of 17.80 square miles. Sandy Creek has a drainage area of 17.61 square miles. The unnamed tributary below structure no. 6 has a drainage area of 1.68 square miles. Boyceville West drainageway has a drainage area of 2.8 square miles. Boyceville East drainageway has a drainage area of 2.12 square miles. The total drainage area of Tiffany Creek is 69.63 square miles. Tiffany Creek is in USGS Hydrologic Unit 07050007.

The climate is typically continental. January temperatures average 14°F. July, the warmest month, has an average temperature of 73°F. Precipitation averages 29 inches per year. (Reference 6)

Tiffany Creek lies in the glaciated area in west-central Wisconsin. The topography is characterized by moderately rolling uplands, relatively steep valley slopes, and broad flat flood plains. These uplands are at mean sea level elevations of nearly 1,300 feet. Slopes extending from the ridges to the valley floors vary from 15 to 40 percent throughout the watershed with the more abrupt slopes located in Beaver Creek.

Upland soils in Beaver Creek consist of Freer, Sargeant, and Vlasaty silt loams, which are in hydrologic group C. Upland soils in the Tiffany and Sandy Creek areas consist of Santiago, Freeon, and Otterholt silt loams, which are in hydrologic group B.

The flood plain soils are alluvial bottom land soils subject to frequent overflow and consist of Meridian loams and fine sandy loams and Kato and Ettrick silt loams.

Cover in the watershed is good. The agricultural economy in the watershed is primarily dairying with large amounts of forage being required. Land use in Glen Hills watershed is as follows:

	<u>Percent</u>
Cropland	45
Woodland	12
Pasture	30
Idle	5
Other - Roads, urban	8
Total	<u>100</u>

## Natural and Beneficial Flood Plain Values

The undeveloped portion of the study area consists primarily of cropland and pastureland interspersed with scattered woodlots, wetlands, and idle meadows. The cropland is used to produce corn, alfalfa, and soybeans. Some of the soils in the flood plain are considered prime agricultural soils. Most of the pasture is unimproved bluegrass or canarygrass. Wooded areas are mainly silver maple, red maple, box elder, basswood, cottonwood, and willow. The idle meadows are a mixture of forbs and grasses. Goldenrod, ragweed, milkweed, timothy, bluegrass, and brome grass are common species in these areas.

Because of the diversity of land-cover types, the study area provides good habitat for a wide range of wildlife species including raccoon, grey and red fox, striped skunk, grey and fox squirrel, mink, muskrat, cottontail rabbit, and white-tailed deer. There are also ring-necked pheasants, and a wide variety of songbirds, hawks, owls, and waterfowl.

Tiffany Creek and its tributaries, Sandy Creek and Beaver Creek, are classified by the Wisconsin Department of Natural Resources as Class II trout streams. Overpastured streambanks and sediment runoff limit their potential.

There is good opportunity for environmental enhancement through a stream corridor management program which could include streambank fencing, improved livestock crossings, and grass and tree plantings. This would result in better water quality, as well as an improvement of fish and wildlife habitat.

Along with producing crops, forage for livestock, wood products, and wildlife, the entire flood plain provides a broad area to spread out and temporarily store floodwaters. The slowing of runoff across the flood plain allows additional time for the runoff to infiltrate and recharge the ground water.

The Wisconsin DNR does not have any record of the presence of any threatened or endangered plant or animal species in the study area.

There are no sites on the National Register of Historic Places.

Tiffany Creek is not on the Department of Interior Nationwide Rivers Inventory.

## Flooding Problems

Extensive floodwater damage occurred in 1934, 1942, and 1954 during the growing season. A severe flood occurs in the watershed about once every 12 years. Two state highway bridges were destroyed in 1934. Another state highway bridge was destroyed in 1942, and two county highway bridges in 1954. Glenwood City also suffered considerable damages in 1954. Small floods in tributary areas have occurred as often as five times in one year. One Sunday, April 27, 1975, a rainstorm of 3 to 7 inches (obtained from a bucket survey) caused some of the structures to operate at near capacity. No significant flood damages were noted although the creeks were out of their banks.

### Existing Flood Plain Management

Dunn and St. Croix Counties, Glenwood City, and Boyceville have approved flood plain zoning ordinances but no detailed flood plain maps. They are operating with the flood hazard maps issued by HUD. Downing has no ordinance. All areas are in the emergency flood insurance program.

### Future Flood Plain Management

The results of this flood plain management study will be incorporated into a flood plain zoning ordinance which will provide standards for all development in the flood fringe and restrict development in the floodway to minimize adverse impact on life, health, and property.

### Alternatives for Mitigating Flood Damages to Existing and Future Development

- A. Apply existing standards set forth in the subdivision control ordinance to regulate development in nonsuitable areas and minimize erosion and diffused surface water runoff within the watershed.
- B. Establish conservancy districts for those areas highly conducive to erosion and unsuitable for development.
- C. Relocate homes in the floodway and flood proof those existing homes in the flood fringe by elevating, filling basements, and providing dry land access during floods.
- D. Modify and improve stream channel and bridge and culvert capacity throughout the watershed or construct levees, dikes, and dams to confine 100-year floodflows within the stream channel or floodway. This alternative may have high installation and maintenance costs which should be thoroughly evaluated.
- E. Provide a reservoir monitoring system for the dams above Glenwood City. The proposal should include but not be limited to:
  - 1. Specifications for monitoring and warning devices.
  - 2. Communications network.
  - 3. Cost estimate for:
    - a. installation
    - b. operation and maintenance.



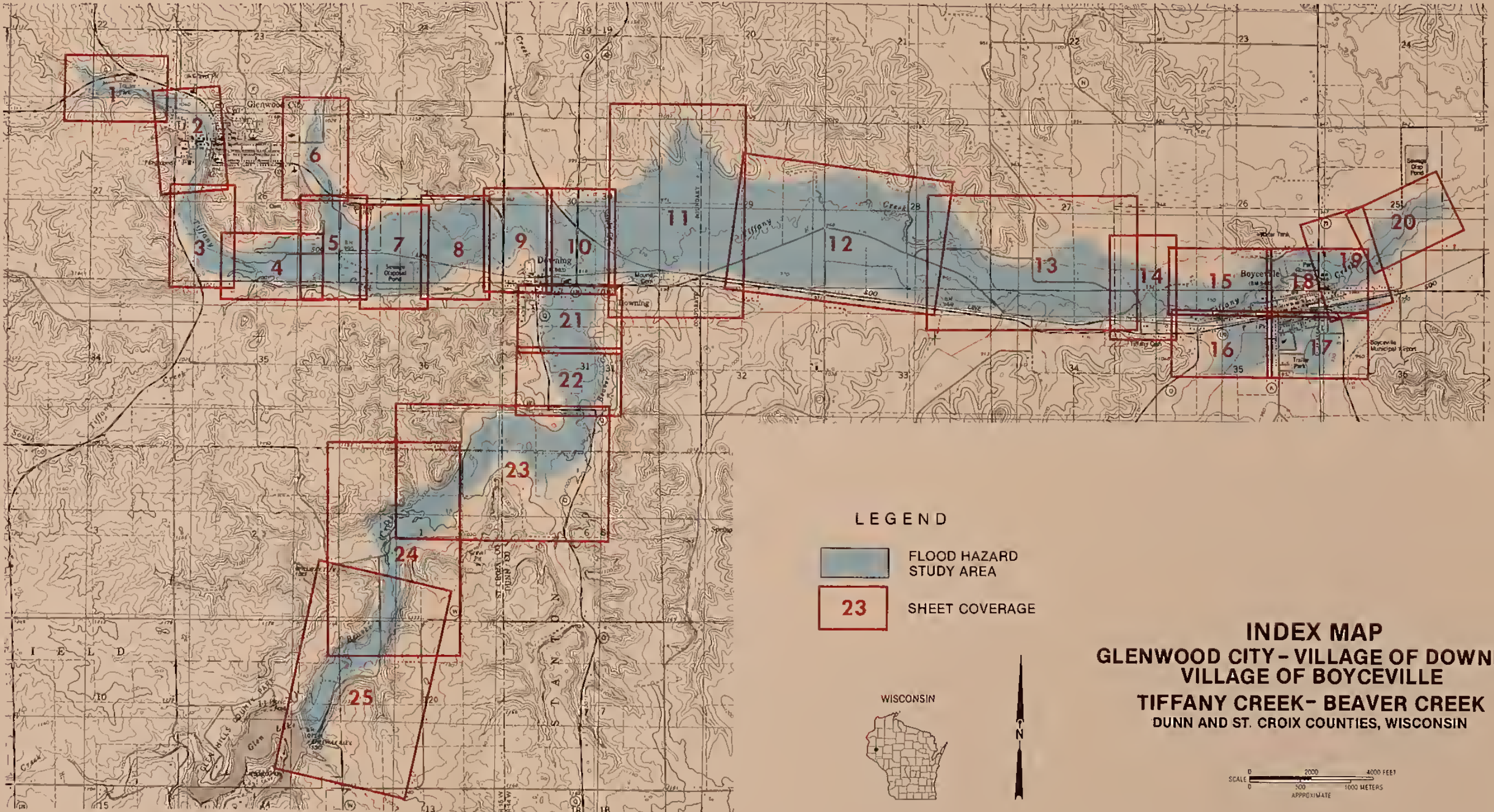


## Appendix A

### FLOOD BOUNDARY MAPS





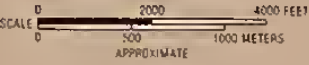


LEGEND

- FLOOD HAZARD STUDY AREA
- 23 SHEET COVERAGE



INDEX MAP  
GLENWOOD CITY - VILLAGE OF DOWNING  
VILLAGE OF BOYCEVILLE  
TIFFANY CREEK - BEAVER CREEK  
DUNN AND ST. CROIX COUNTIES, WISCONSIN





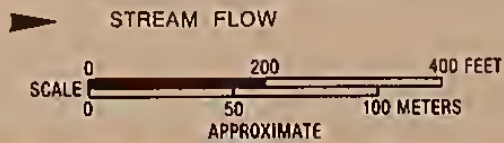




- FLOODWAY
- FLOODPLAIN (WITH STRUCTURES)
- FLOODPLAIN (WITHOUT STRUCTURES)

LEGEND

- RM 9 REFERENCE MARK
- CROSS SECTION LOCATION



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

FLOOD PLAIN MANAGEMENT STUDY  
DUNN AND ST. CROIX COUNTIES, WISCONSIN

FLOOD HAZARD AREA

GLENWOOD CITY - TIFFANY CREEK



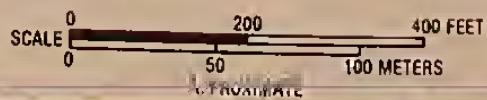


- FLOODWAY
- FLOODPLAIN (WITH STRUCTURES)
- FLOODPLAIN (WITHOUT STRUCTURES)

LEGEND

- RM 9 REFERENCE MARK
- CROSS SECTION LOCATION

STREAM FLOW



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
DUNN AND ST. CROIX COUNTIES, WISCONSIN

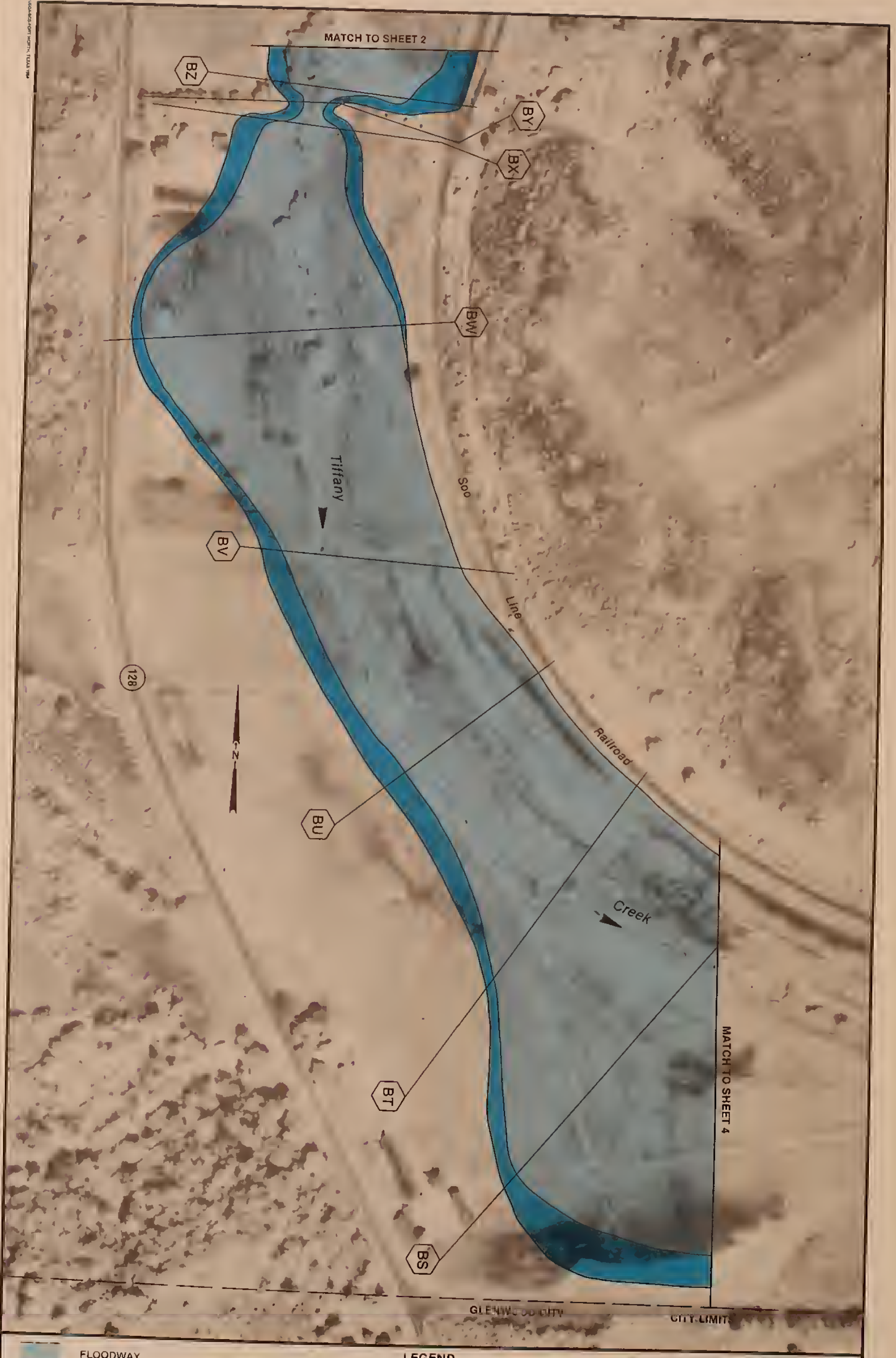
**FLOOD HAZARD AREA**

**GLENWOOD CITY - TIFFANY CREEK**





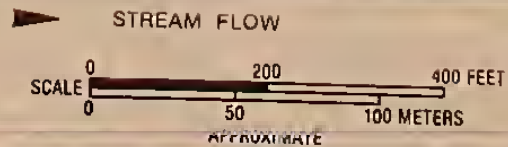
10004525 FORT WORTH, TEXAS 76104



- FLOODWAY
- FLOODPLAIN (WITH STRUCTURES)
- FLOODPLAIN (WITHOUT STRUCTURES)

LEGEND

- X RM 9 REFERENCE MARK
- AX CROSS SECTION LOCATION



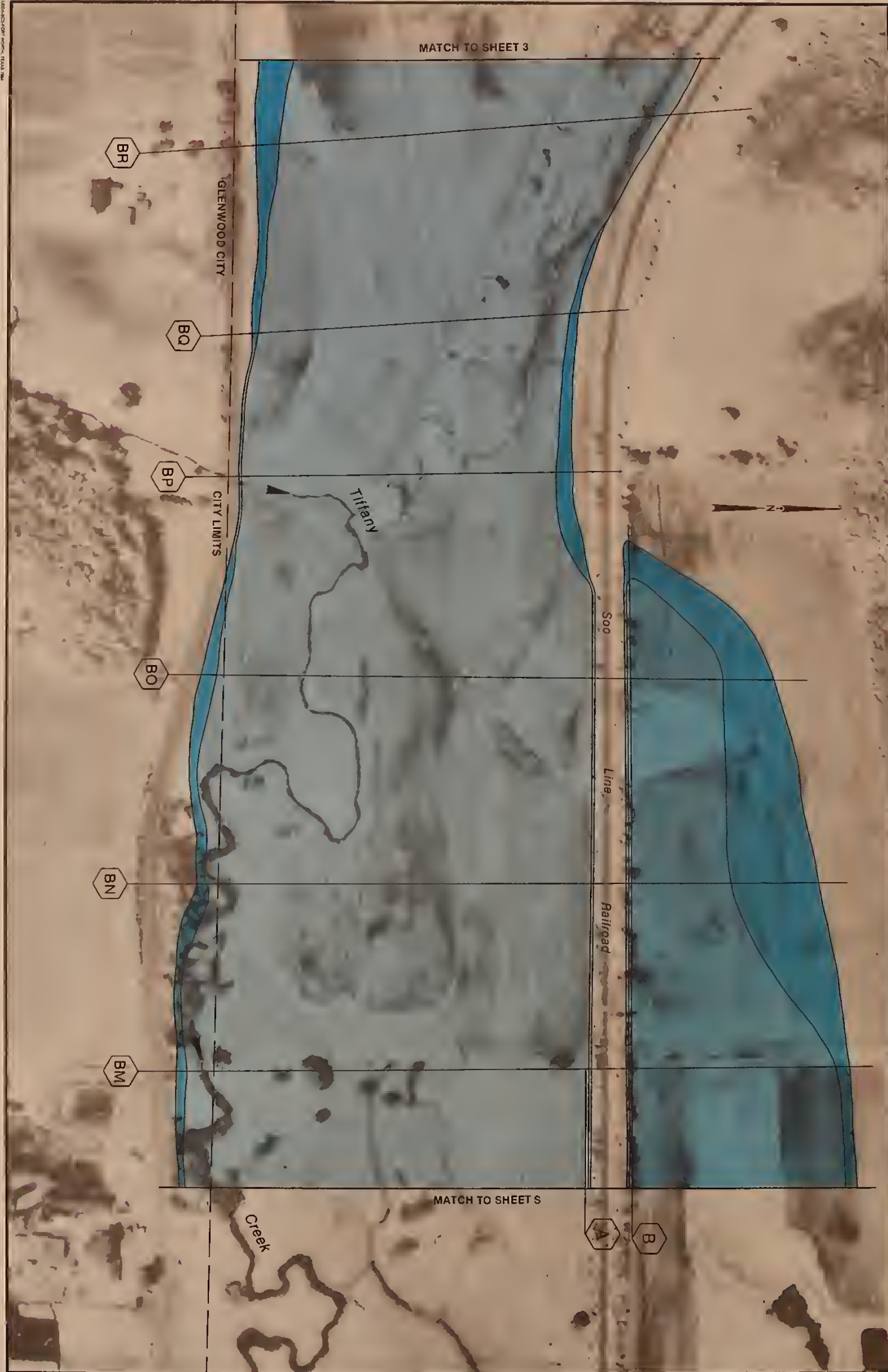
U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
DUNN AND ST. CROIX COUNTIES, WISCONSIN

**FLOOD HAZARD AREA**

**GLENWOOD CITY - TIFFANY CREEK**



12504-01-001 (Rev. 1-78)



MATCH TO SHEET 3

GLENWOOD CITY

CITY LIMITS

Tiffany

Soo

Line

Railroad

MATCH TO SHEET 5

Creek



FLOODWAY

FLOODPLAIN (WITH STRUCTURES)

FLOODPLAIN (WITHOUT STRUCTURES)

LEGEND

X RM 9

REFERENCE MARK

AX

CROSS SECTION LOCATION



STREAM FLOW



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
DUNN AND ST. CROIX COUNTIES, WISCONSIN

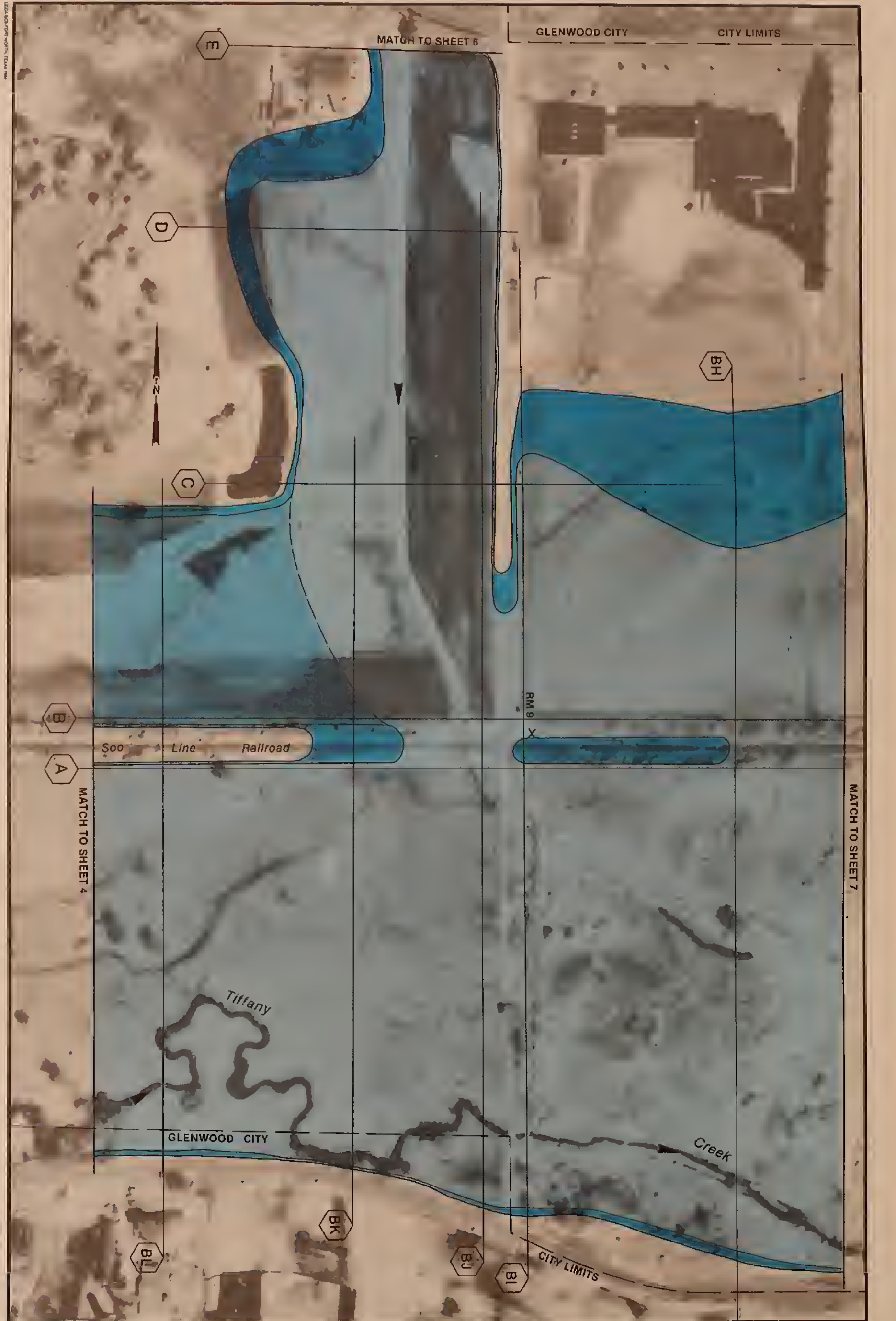
**FLOOD HAZARD AREA**  
**GLENWOOD CITY - TIFFANY CREEK**

SHEET 4 OF 25

DEC. 1983 4-R-38504







FLOODWAY

FLOODPLAIN (WITH STRUCTURES)

FLOODPLAIN (WITHOUT STRUCTURES)

X RM 9

REFERENCE MARK

AX

CROSS SECTION LOCATION

STREAM FLOW

SCALE 0 200 400 FEET  
0 50 100 METERS  
APPROXIMATE
















5000-103-001 (REV. 11-74)

MATCH TO SHEET 5

MATCH TO SHEET 8



 FLOODWAY	 RM 9 REFERENCE MARK	 STREAM FLOW
 FLOODPLAIN (WITH STRUCTURES)	 CROSS SECTION LOCATION	
 FLOODPLAIN (WITHOUT STRUCTURES)		

SHEET 7 OF 25  
DEC. 1983 J.R.36304  
U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
DUNN AND ST. CROIX COUNTIES, WISCONSIN

**FLOOD HAZARD AREA**  
**GLENWOOD CITY - TIFFANY CREEK**

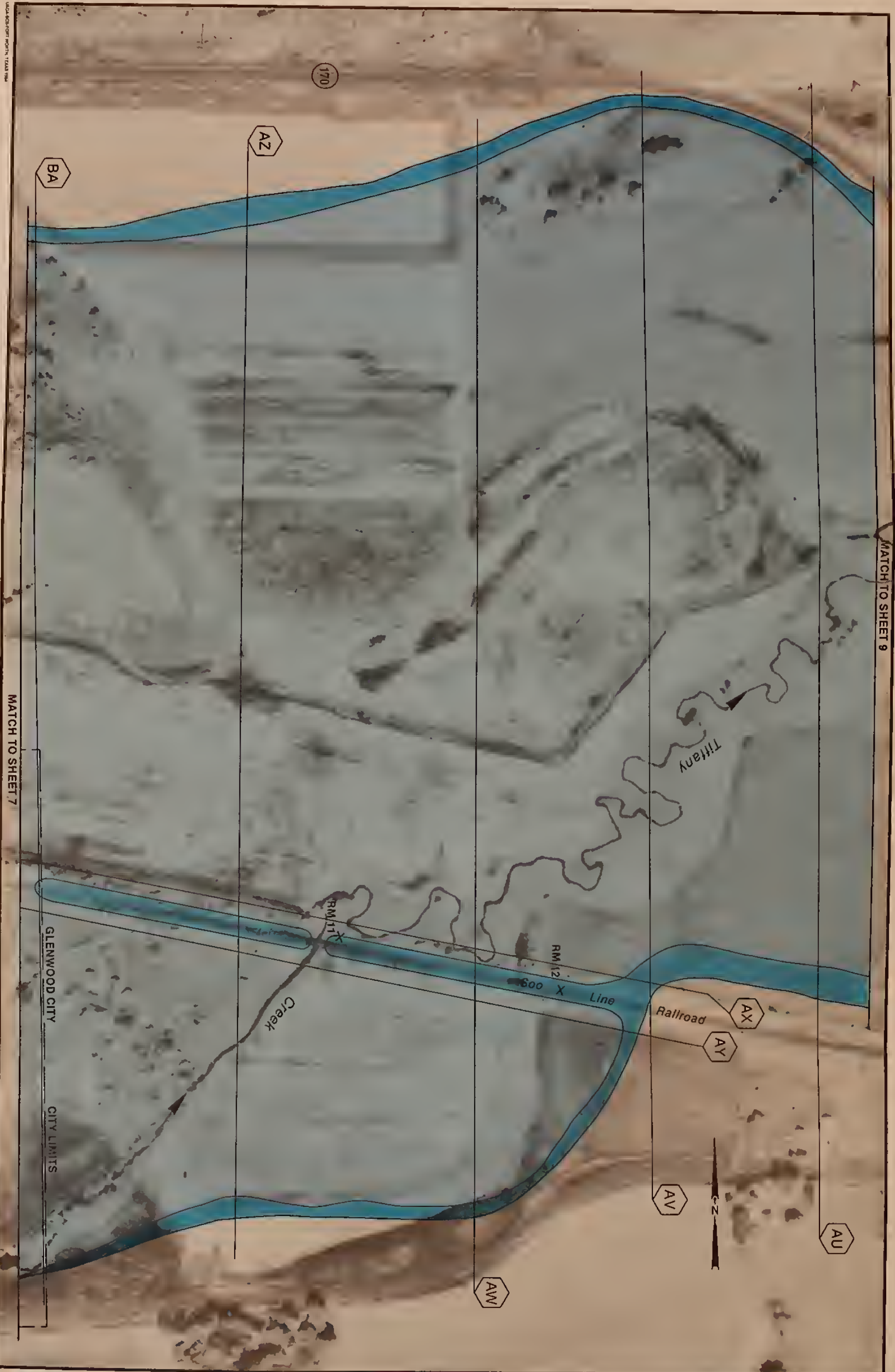









WATER OF THE NORTH TOWN

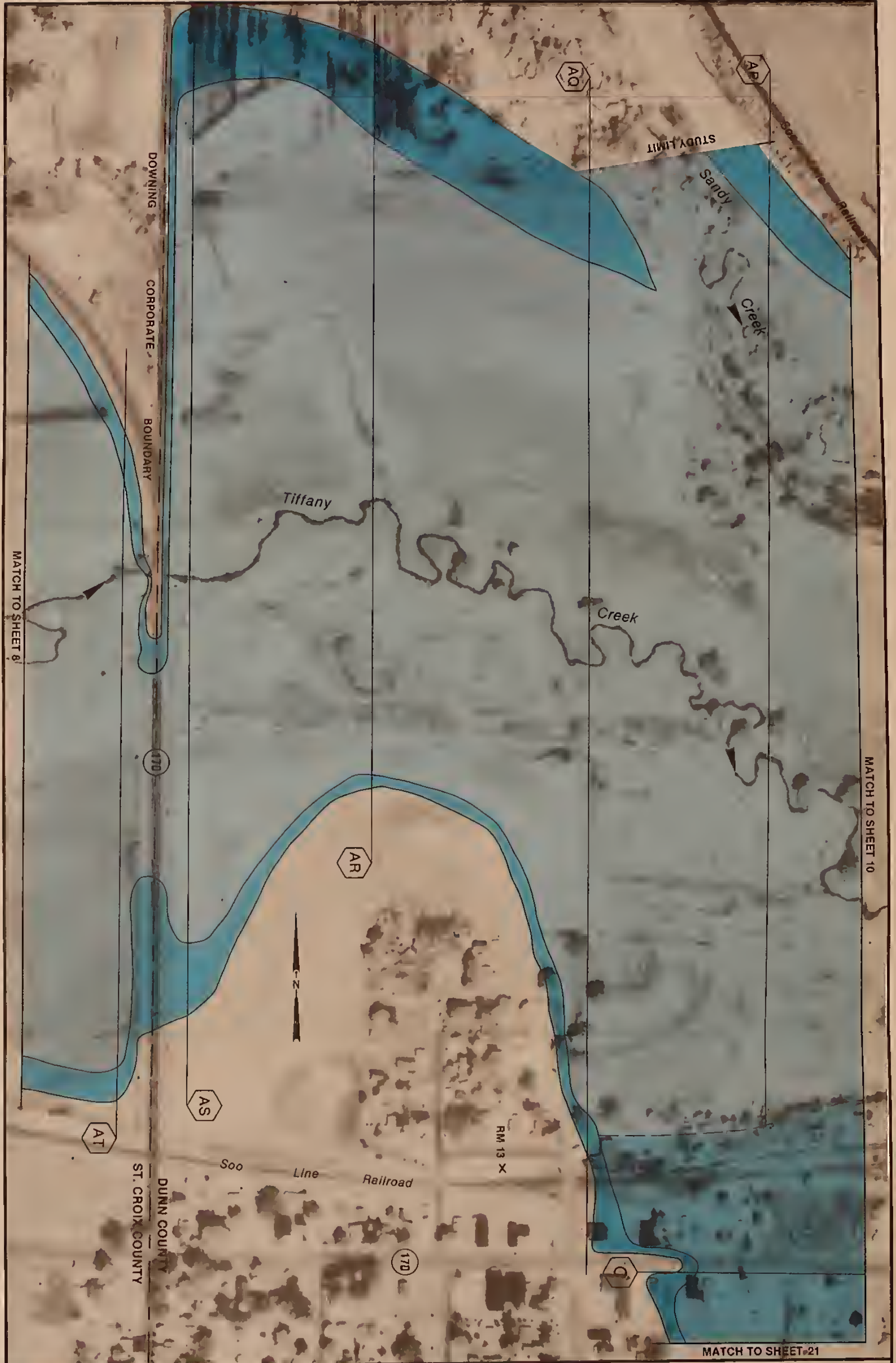
MATCH TO SHEET 7

MATCH TO SHEET 9



 FLOODWAY	<b>LEGEND</b>  X RM 9 REFERENCE MARK  CROSS SECTION LOCATION	 STREAM FLOW
 FLOODPLAIN (WITH STRUCTURES)		SCALE 0 200 400 FEET 0 50 100 METERS APPROXIMATE
 FLOODPLAIN (WITHOUT STRUCTURES)		





MATCH TO SHEET 8

MATCH TO SHEET 10

MATCH TO SHEET 21

- FLOODWAY
- FLOODPLAIN (WITH STRUCTURES)
- FLOODPLAIN (WITHOUT STRUCTURES)

- X RM 9 REFERENCE MARK
- AX CROSS SECTION LOCATION

- STREAM FLOW
- SCALE 0 200 400 FEET  
0 50 100 METERS  
APPROXIMATE

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
DUNN AND ST. CROIX COUNTIES, WISCONSIN

## FLOOD HAZARD AREA

### VILLAGE OF DOWNING -TIFFANY CREEK



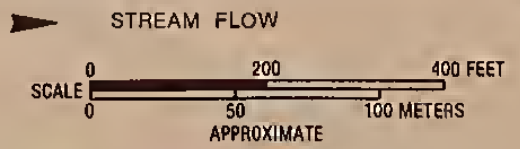




- FLOODWAY
- FLOODPLAIN (WITH STRUCTURES)
- FLOODPLAIN (WITHOUT STRUCTURES)

#### LEGEND

- RM 9 REFERENCE MARK
- AX CROSS SECTION LOCATION



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
DUNN AND ST. CROIX COUNTIES, WISCONSIN

## FLOOD HAZARD AREA

**VILLAGE OF DOWNING - TIFFANY CREEK**

MATCH TO SHEET 9

DOWNING

CORPORATE

BOUNDARY

MATCH TO SHEET 11

AL

A

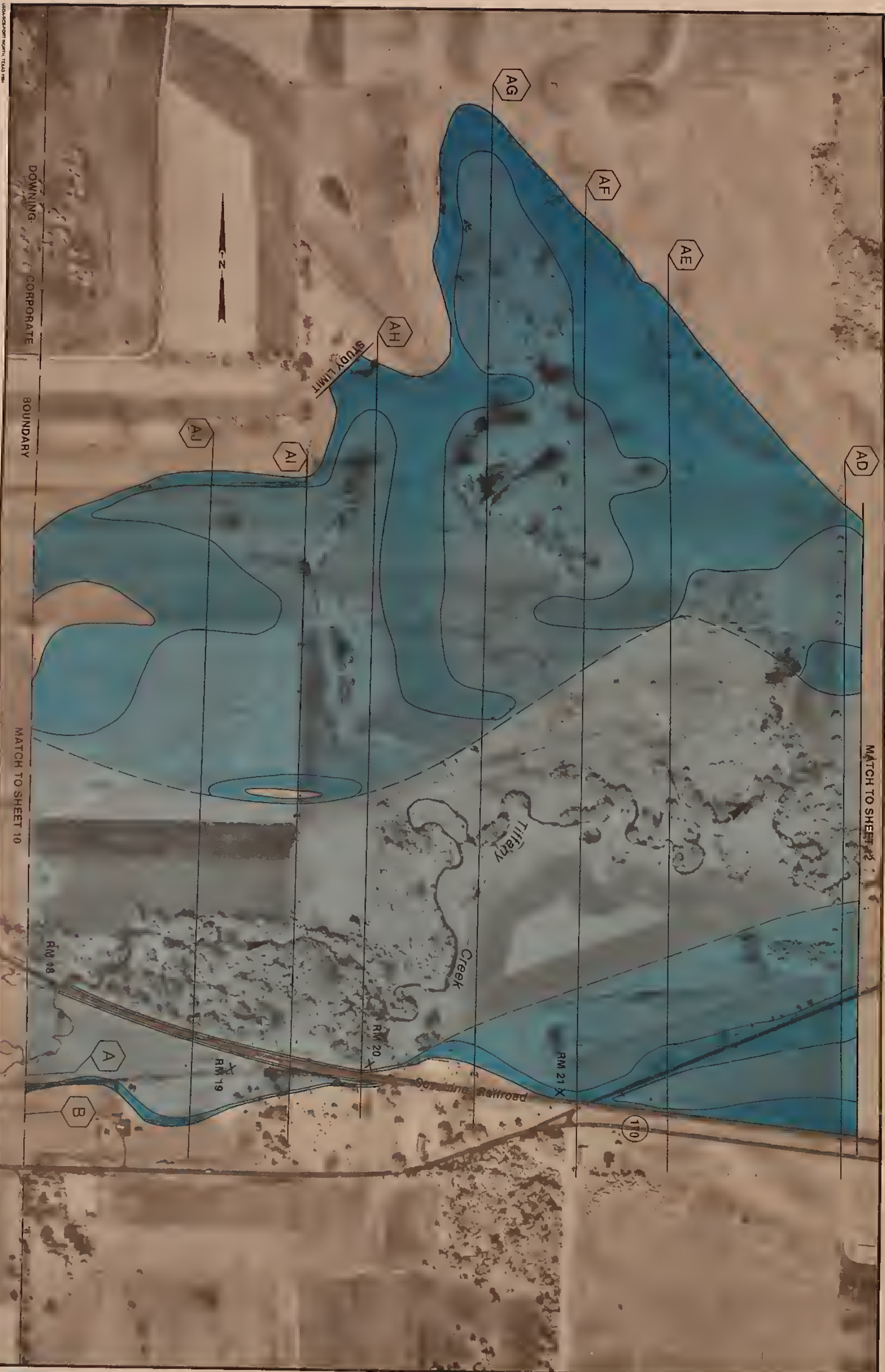
B

C

170

MATCH TO SHEET 21











FLOODWAY FLOODPLAIN (WITH STRUCTURES) FLOODPLAIN (WITHOUT STRUCTURES)	<b>LEGEND</b> RM 9 REFERENCE MARK CROSS SECTION LOCATION	STREAM FLOW SCALE 
---	--	--------------------------

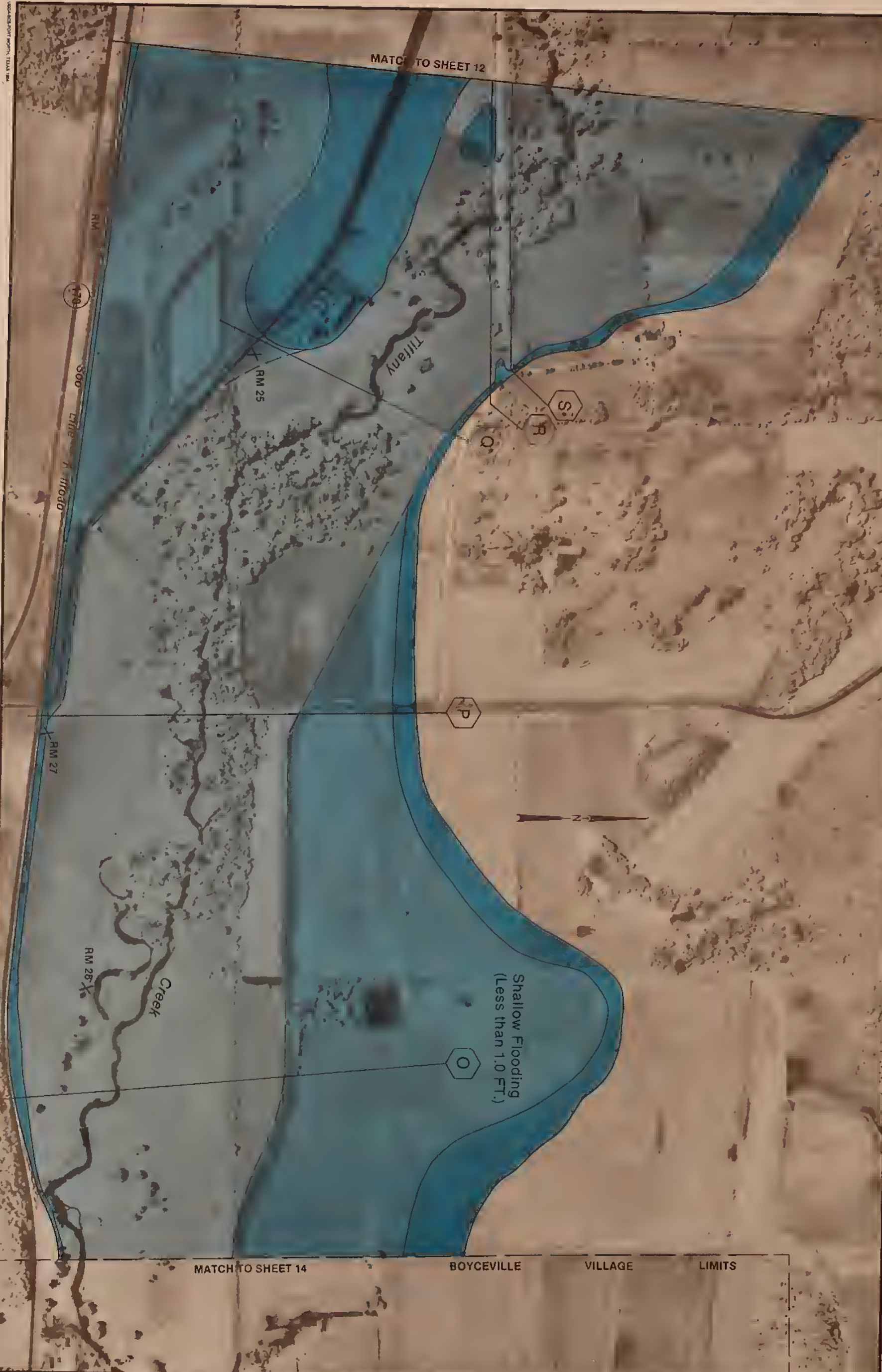






 FLOODWAY	 RM 9 REFERENCE MARK	 STREAM FLOW SCALE 0 400 800 FEET 0 100 200 METERS APPROXIMATE
 FLOODPLAIN (WITH STRUCTURES)	 AX CROSS SECTION LOCATION	
 FLOODPLAIN (WITHOUT STRUCTURES)		





FLOODWAY FLOODPLAIN (WITH STRUCTURES) FLOODPLAIN (WITHOUT STRUCTURES)	<b>LEGEND</b> X RM 9 REFERENCE MARK CROSS SECTION LOCATION	STREAM FLOW SCALE 0 400 800 FEET 0 100 200 METERS APPROXIMATE
---	--	---

U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
 DUNN AND ST. CROIX COUNTIES, WISCONSIN

**FLOOD HAZARD AREA**  
**TIFFANY CREEK**







MATCH TO SHEET 16



FLOODWAY

FLOODPLAIN (WITH STRUCTURES)

FLOODPLAIN (WITHOUT STRUCTURES)

### LEGEND

X RM 9

REFERENCE MARK



CROSS SECTION LOCATION



## STREAM FLOW

SCALE 1

1

20

OXIMATE

1

10

00

AS

FE

ET

1

1

## FLOOD HAZARD AREA

## VILLAGE OF BOYCEVILLE-TIFFANY CREEK



MATCH TO SHEET 14

Tiffany

Creek

West

Drainage

MATCH TO SHEET 18

FLOODWAY

FLOODPLAIN (WITH STRUCTURES)

FLOODPLAIN (WITHOUT STRUCTURES)

LEGEND

X RM 9

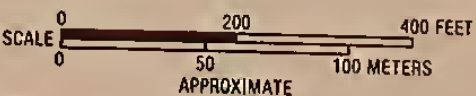
REFERENCE MARK

AX

CROSS SECTION LOCATION



STREAM FLOW



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

FLOOD PLAIN MANAGEMENT STUDY  
DUNN AND ST. CROIX COUNTIES, WISCONSIN

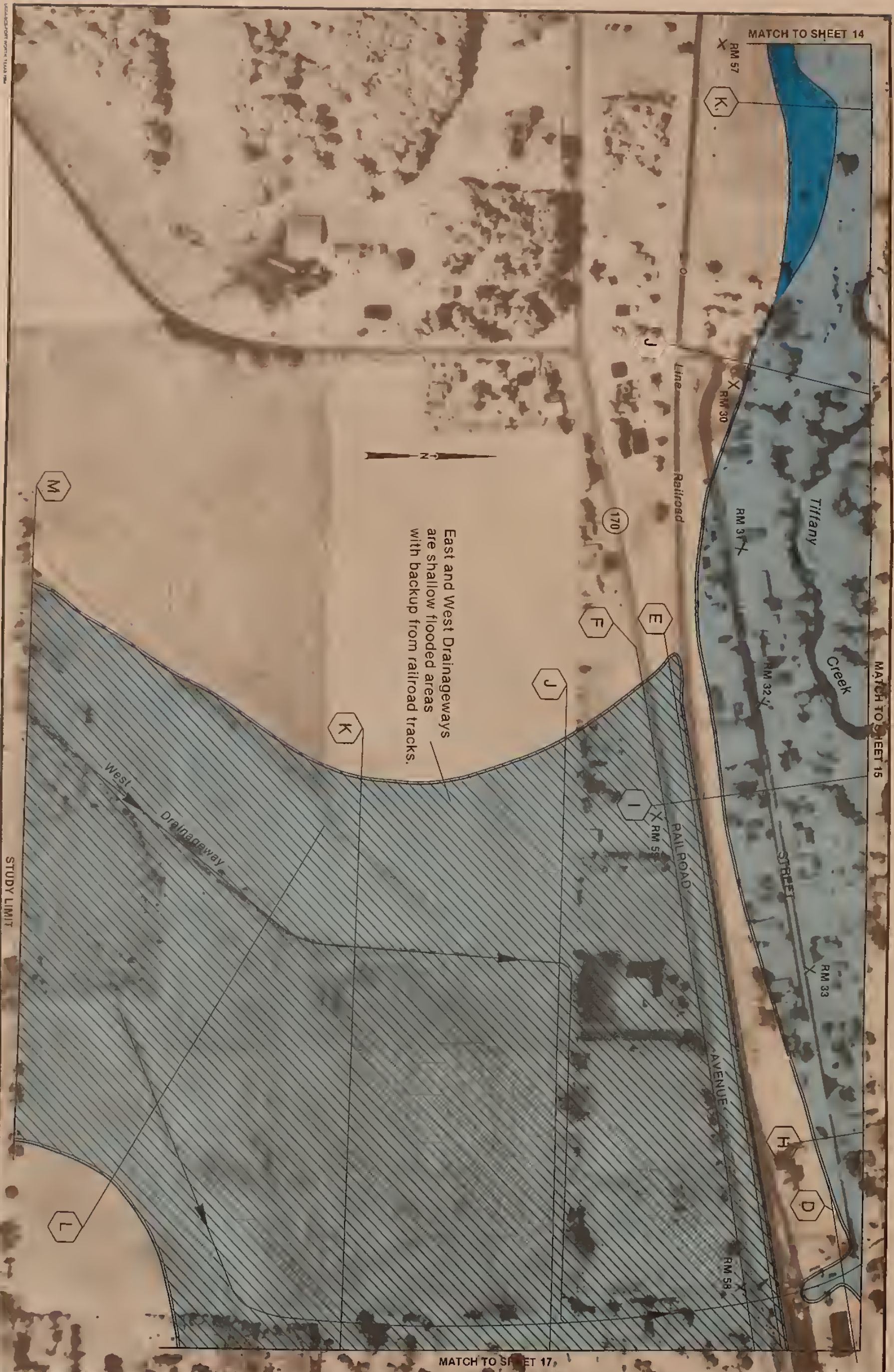
FLOOD HAZARD AREA

VILLAGE OF BOYCEVILLE-TIFFANY CREEK







ADAPTED FROM NORTH TIAAN 1984




STUDY LIMIT



FLOODWAY




FLOODPLAIN (WITH STRUCTURES)




FLOODPLAIN (WITHOUT STRUCTURES)

**LEGEND**




RM 9


REFERENCE MARK



AX

CROSS SECTION LOCATION

 STREAM FLOW

SCALE  0 200 400 FEET  
0 50 100 METERS  
APPROXIMATE










**MATCH TO SHEET 18**

MATCH TO SHEET 19

	FLOODWAY
	FLOODPLAIN (WITH STRUCTURES)
	FLOODPLAIN (WITHOUT STRUCTURES)

### LEGEND

X RM 9

REFERENCE MARK



CROSS SECTION LOCATION

## STREAM FLOW

SCALE

0  
E  
0

20

1

APPROXIMATE

400 FEET

100

.....

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
**DUNN AND ST. CROIX COUNTIES, WISCONSIN**

## FLOOD HAZARD AREA

## VILLAGE OF BOYCEVILLE-EAST DRAINAGEWAY

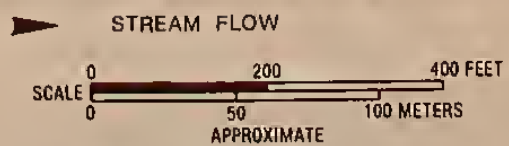






- FLOODWAY
- FLOODPLAIN (WITH STRUCTURES)
- FLOODPLAIN (WITHOUT STRUCTURES)

- LEGEND
- X RM 9 REFERENCE MARK
  - AX CROSS SECTION LOCATION



East and West Drainageways are shallow flooded areas with backup from railroad tracks.

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
FLOOD PLAIN MANAGEMENT STUDY  
DUNN AND ST. CROIX COUNTIES, WISCONSIN

# FLOOD HAZARD AREA

## VILLAGE OF BOYCEVILLE-TIFFANY CREEK







FLOODWAY FLOODPLAIN (WITH STRUCTURES) FLOODPLAIN (WITHOUT STRUCTURES)	<b>LEGEND</b> RM 9 REFERENCE MARK CROSS SECTION LOCATION	STREAM FLOW SCALE 0 200 400 FEET 0 50 100 METERS APPROXIMATE
---	--	---





MATCH TO SHEET 19

X RM 45

Tiffany

BOYCEVILLE  
VILLAGE  
LIMITS

Creek

STUDY LIMIT

BOYCEVILLE  
VILLAGE  
LIMITS

LIMITS

FLOODWAY

FLOODPLAIN (WITH STRUCTURES)

FLOODPLAIN (WITHOUT STRUCTURES)

LEGEND

X RM 9

REFERENCE MARK

AX

CROSS SECTION LOCATION

STREAM FLOW

SCALE

0 200 400 FEET

0 50 100 METERS

APPROXIMATE

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
DUNN AND ST. CROIX COUNTIES, WISCONSIN

**FLOOD HAZARD AREA**

**VILLAGE OF BOYCEVILLE-TIFFANY CREEK**



LOOK EAST FROM NORTH, TELLER 1984



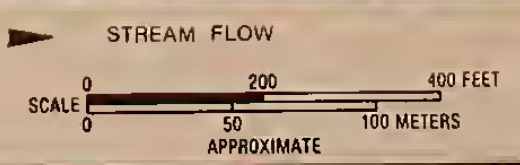
DOWNING

CORPORATE

BOUNDARY

- FLOODWAY
- FLOODPLAIN (WITH STRUCTURES)
- FLOODPLAIN (WITHOUT STRUCTURES)

- LEGEND**
- RM 9 REFERENCE MARK
  - AX CROSS SECTION LOCATION



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
DUNN AND ST. CROIX COUNTIES, WISCONSIN






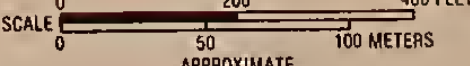

**FLOOD HAZARD AREA**  
**VILLAGE OF DOWNING - BEAVER CREEK**

SHEET 21 OF 25  
DEC. 1983 4-P.28-604







	FLOODWAY		RM 9	REFERENCE MARK		STREAM FLOW
	FLOODPLAIN (WITH STRUCTURES)		AX	CROSS SECTION LOCATION		
	FLOODPLAIN (WITHOUT STRUCTURES)				APPROXIMATE	




U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
DUNN AND ST. CROIX COUNTIES, WISCONSIN



## FLOOD HAZARD AREA

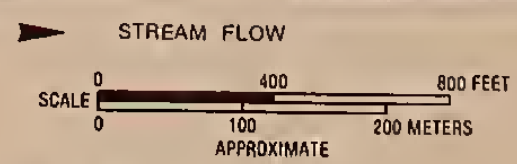
### VILLAGE OF DOWNING - BEAVER CREEK





-  FLOODWAY
-  FLOODPLAIN (WITH STRUCTURES)
-  FLOODPLAIN (WITHOUT STRUCTURES)

- LEGEND**
-  RM 9 REFERENCE MARK
  -  CROSS SECTION LOCATION



U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
**FLOOD PLAIN MANAGEMENT STUDY**  
DUNN AND ST. CROIX COUNTIES, WISCONSIN

## FLOOD HAZARD AREA

### BEAVER CREEK





USDA/CORP NORTH TEXAS 184



FLOODWAY

FLOODPLAIN (WITH STRUCTURES)

FLOODPLAIN (WITHOUT STRUCTURES)

X RM 9

REFERENCE MARK

AX

CROSS SECTION LOCATION

STREAM FLOW

SCALE

0 400 800 FEET

0 100 200 METERS

APPROXIMATE





FLOODWAY

FLOODPLAIN (WITH STRUCTURES)

FLOODPLAIN (WITHOUT STRUCTURES)

RM 9

REFERENCE MARK

CROSS SECTION LOCATION

STREAM FLOW

SCALE

0 400 800 FEET

0 100 200 METERS

APPROXIMATE





## Appendix B

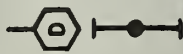
### FLOOD PROFILES





# LEGEND

100-YEAR FLOOD WITHOUT STRUCTURES  
 100-YEAR FLOOD WITH STRUCTURES  
 STREAM BED  
 LOW BANK



CROSS SECTION LOCATION  
 BRIDGE FLOOR  
 LOW POINT IN ROAD  
 LOW CHORD

CORPORATE LIMITS  
 OF BOYCEVILLE

940

B-1

ELEVATION IN FEET (MSL)

930

LIMITS OF STUDY

920

4000 FEET FROM CONFLUENCE WITH HAY RIVER

40+00

50+00

60+00

70+00

STATIONS + FEET

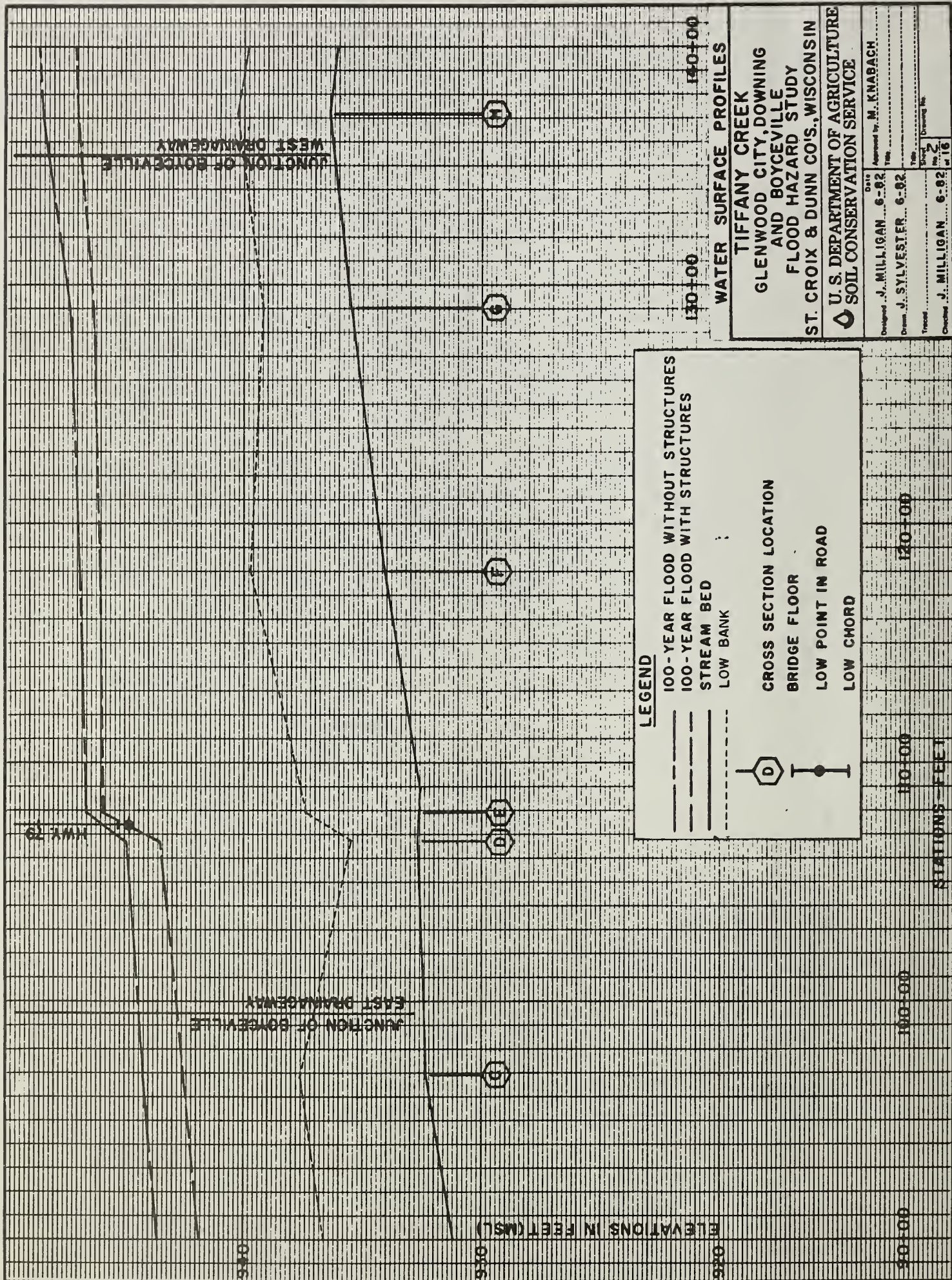
80+00 90+00 100+00

## WATER SURFACE PROFILES

TIFFANY CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S, WISCONSIN  
 U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

DESIGNED BY J. MILLIGAN	DATE 6-82	APPROVED BY M. KNABACH
DRAWN BY J. SYLVESTER	DATE 6-82	TITLE
PROJECT	SHEET 16	DRAWING NO.
CHECKED BY J. MILLIGAN	DATE 6-82	

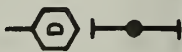




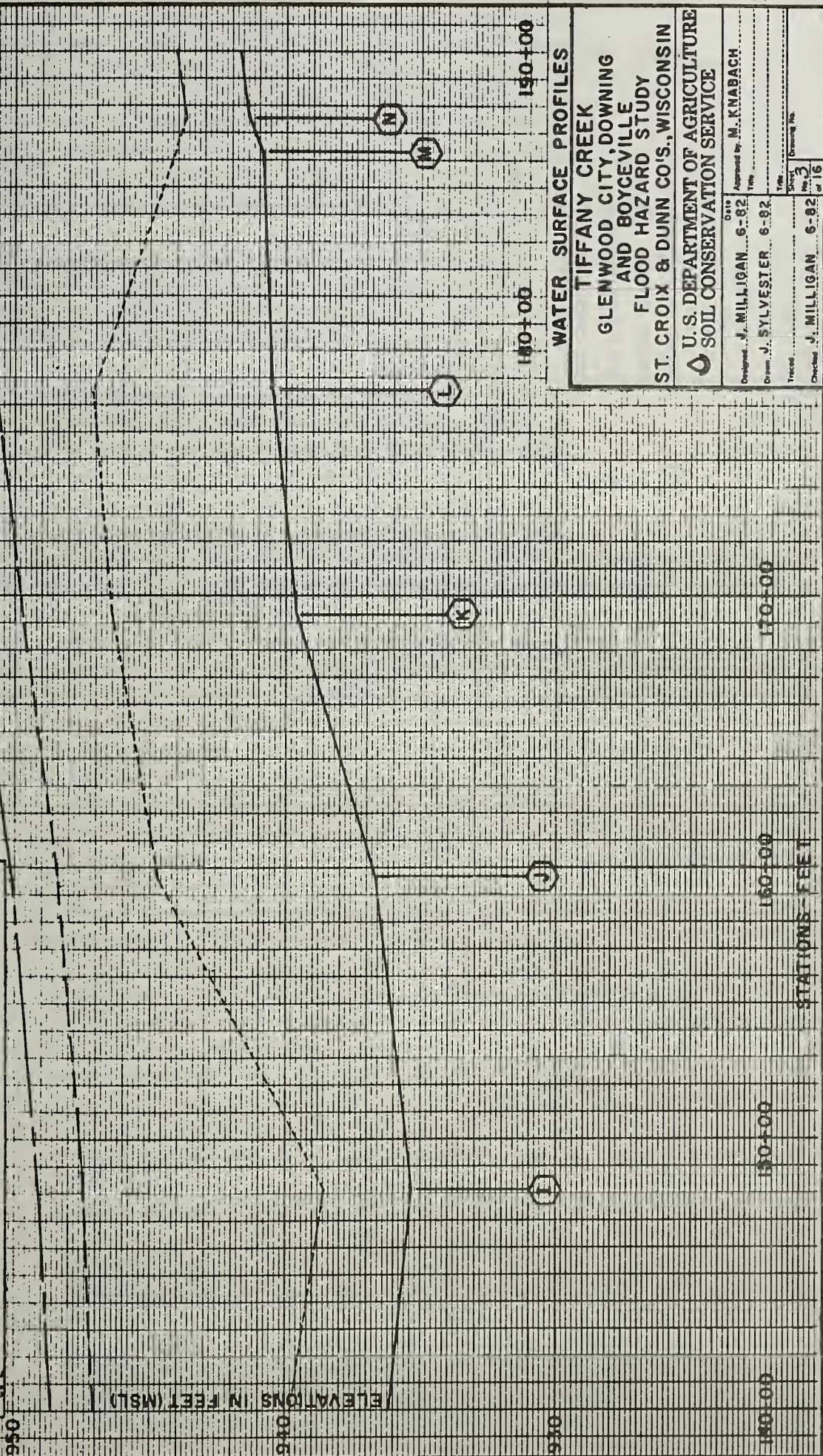


**LEGEND**

- 100-YEAR FLOOD WITHOUT STRUCTURES
- 100-YEAR FLOOD WITH STRUCTURES
- STREAM BED
- LOW BANK



- CROSS SECTION LOCATION
- BRIDGE FLOOR
- LOW POINT IN ROAD
- LOW CHORD



**WATER SURFACE PROFILES**

TIFFANY CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S., WISCONSIN  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed by J. MILLIGAN	Date 6-82	Approved by M. KLABACH
Drawn by J. SYLVESTER	Date 6-82	Checked by J. MILLIGAN
Title		Scale
Sheet 3 of 16		Drawn by



# LEGEND

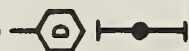
--- 100-YEAR FLOOD WITHOUT STRUCTURES  
 --- 100-YEAR FLOOD WITH STRUCTURES  
 --- STREAM BED  
 --- LOW BANK

## CROSS SECTION LOCATION

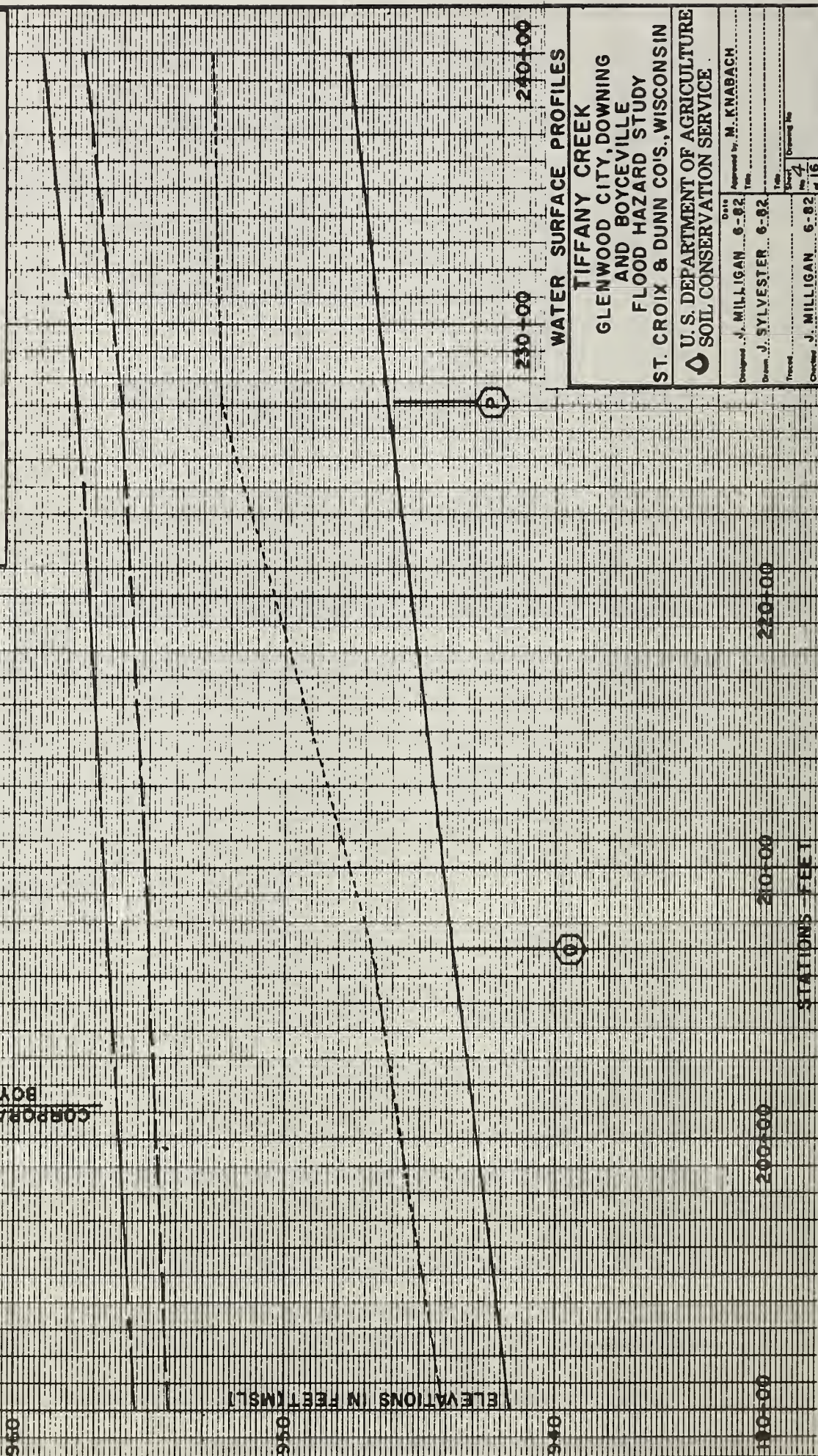
BRIDGE FLOOR

LOW POINT IN ROAD

LOW CHORD



CORPORATE LIMITS OF  
BOYCEVILLE

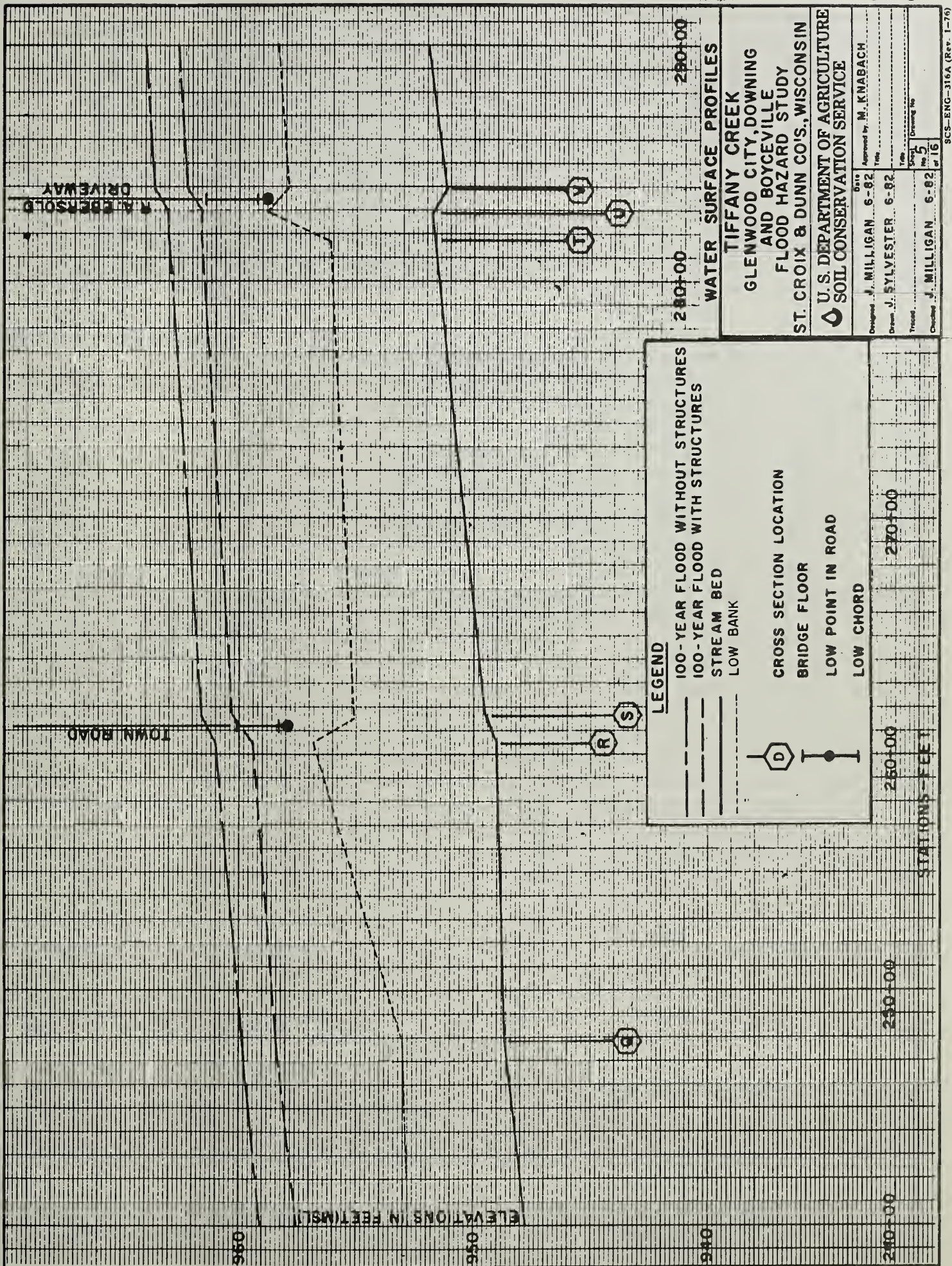


## WATER SURFACE PROFILES

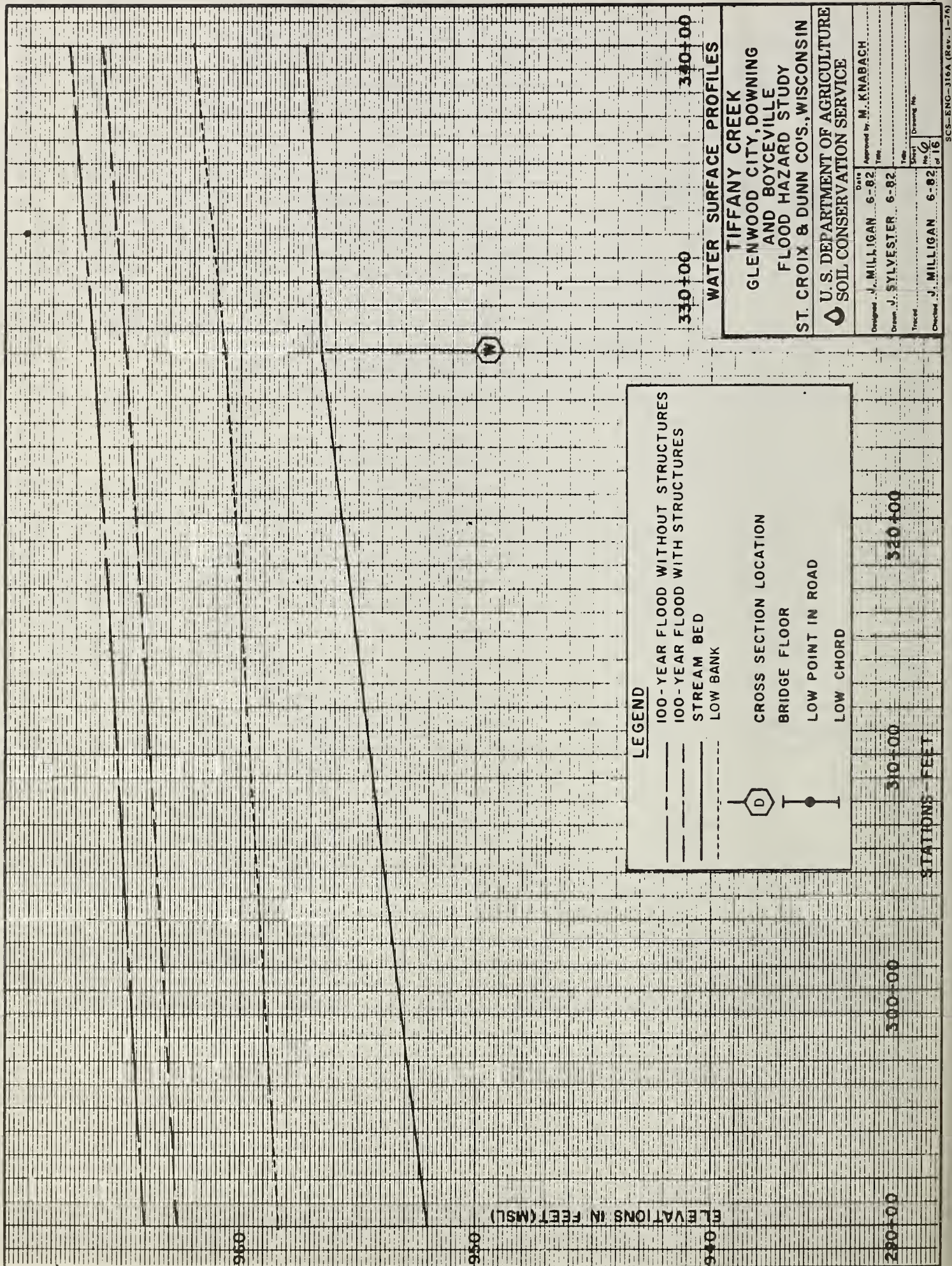
TIFFANY CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S., WISCONSIN  
 U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed by	J. MILLIGAN	Date	6-82
Drawn by	J. SYLVESTER	Date	6-82
Checked by	J. MILLIGAN	Date	6-82
Approved by	M. KNABACH	Date	6-82
Scale	1" = 10'	Sheet	1 of 16

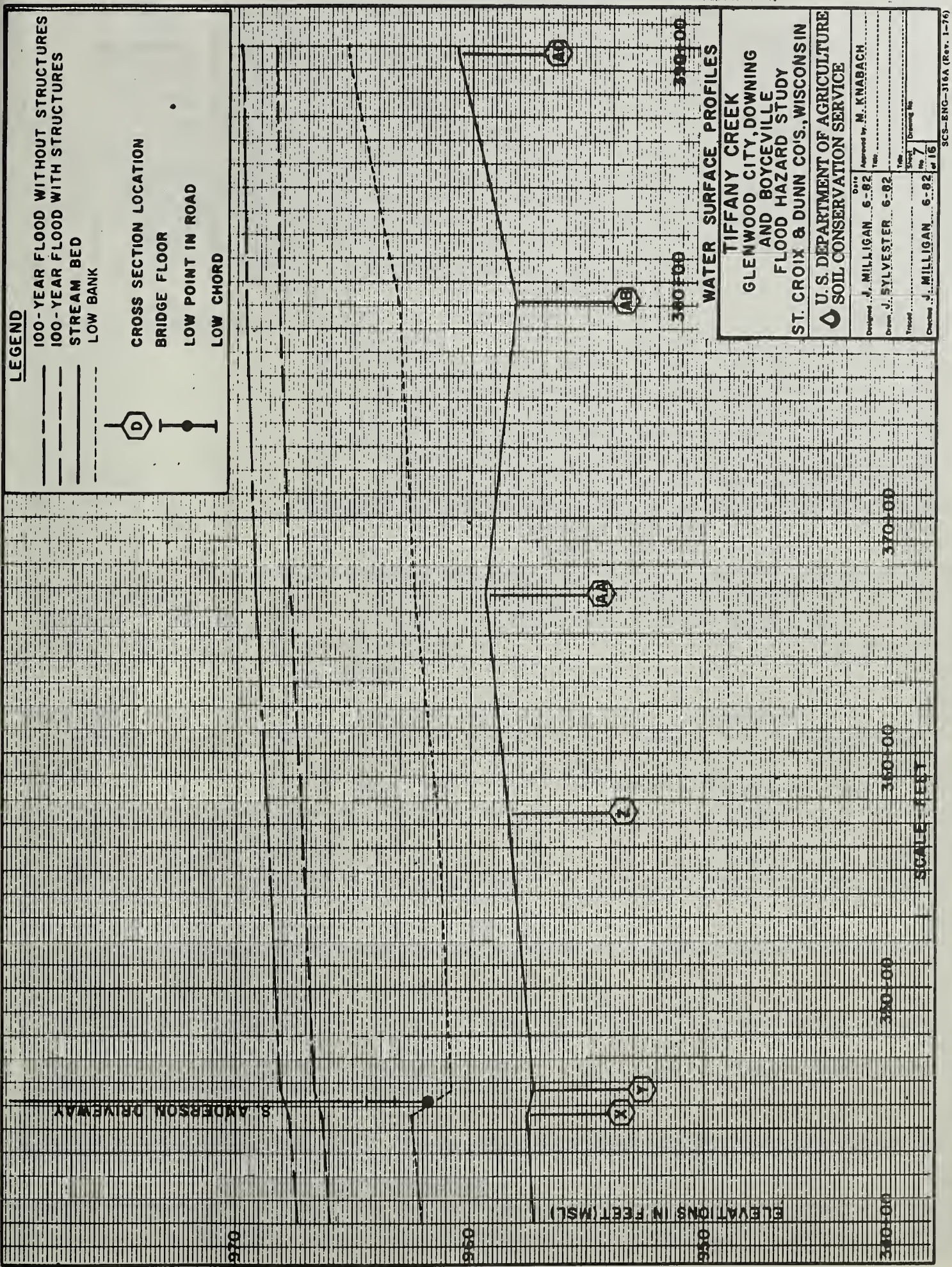










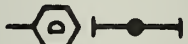


LEGEND

- 100-YEAR FLOOD WITHOUT STRUCTURES
- 100-YEAR FLOOD WITH STRUCTURES
- STREAM BED
- LOW BANK

CROSS SECTION LOCATION

- BRIDGE FLOOR
- LOW POINT IN ROAD
- LOW CHORD

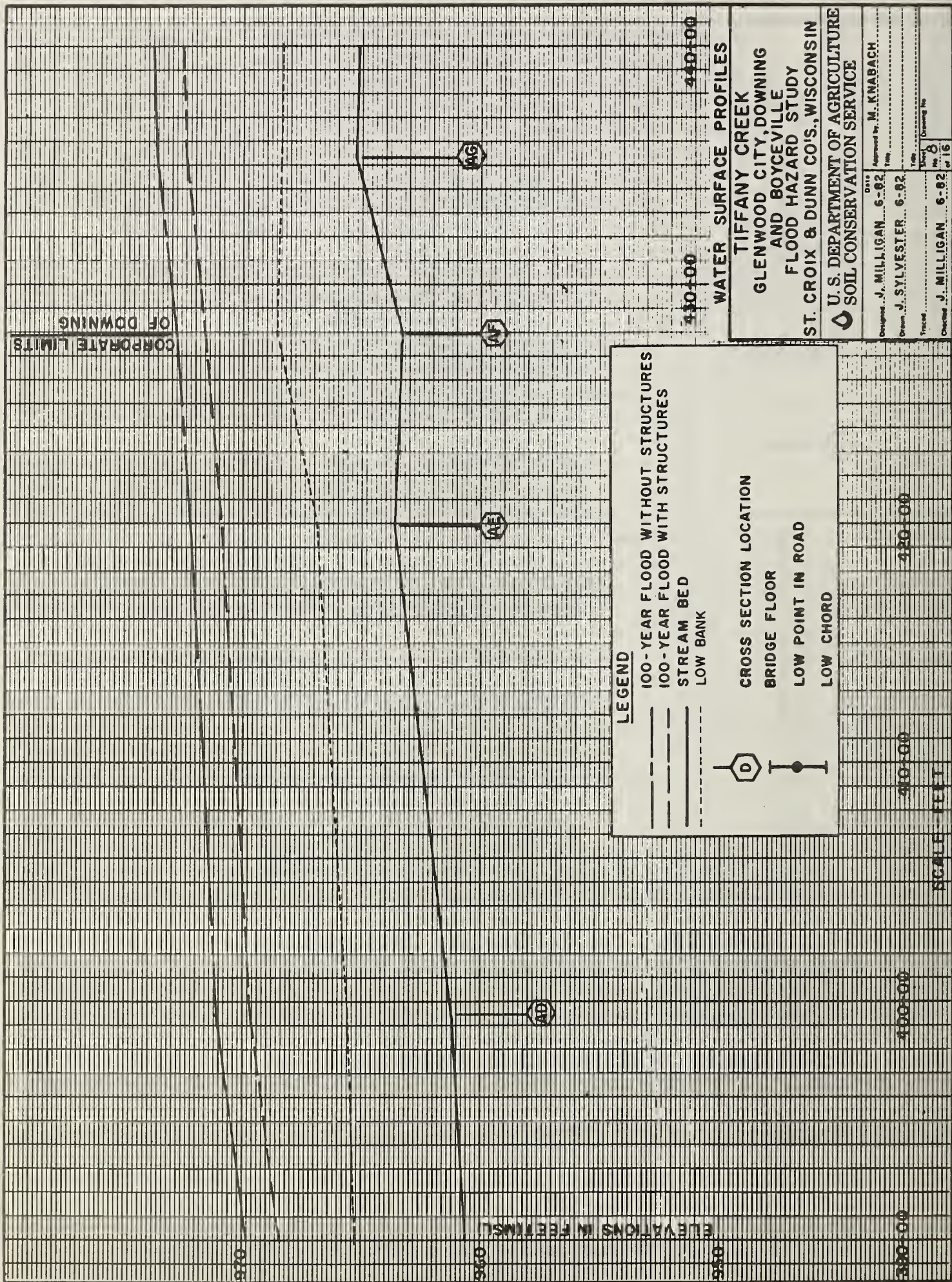


WATER SURFACE PROFILES

TIFFANY CREEK  
GLENWOOD CITY, DOWNING  
AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S, WISCONSIN  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

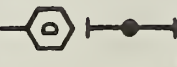
Designed by	J. MILLIGAN	Date	6-82	Approved by	M. KNABACH
Drawn by	J. SYLVESTER	Date	6-82	Checked by	
Traced by		Date		Reviewed by	
Checked by	J. MILLIGAN	Date	6-82	Sheet No.	7
				Drawing No.	





**LEGEND**

- - - 100-YEAR FLOOD WITHOUT STRUCTURES  
 - - - 100-YEAR FLOOD WITH STRUCTURES  
 - · - STREAM BED  
 - - - LOW BANK


**CROSS SECTION LOCATION**  
 BRIDGE FLOOR  
 LOW POINT IN ROAD  
 LOW CHORD

**WATER SURFACE PROFILES**

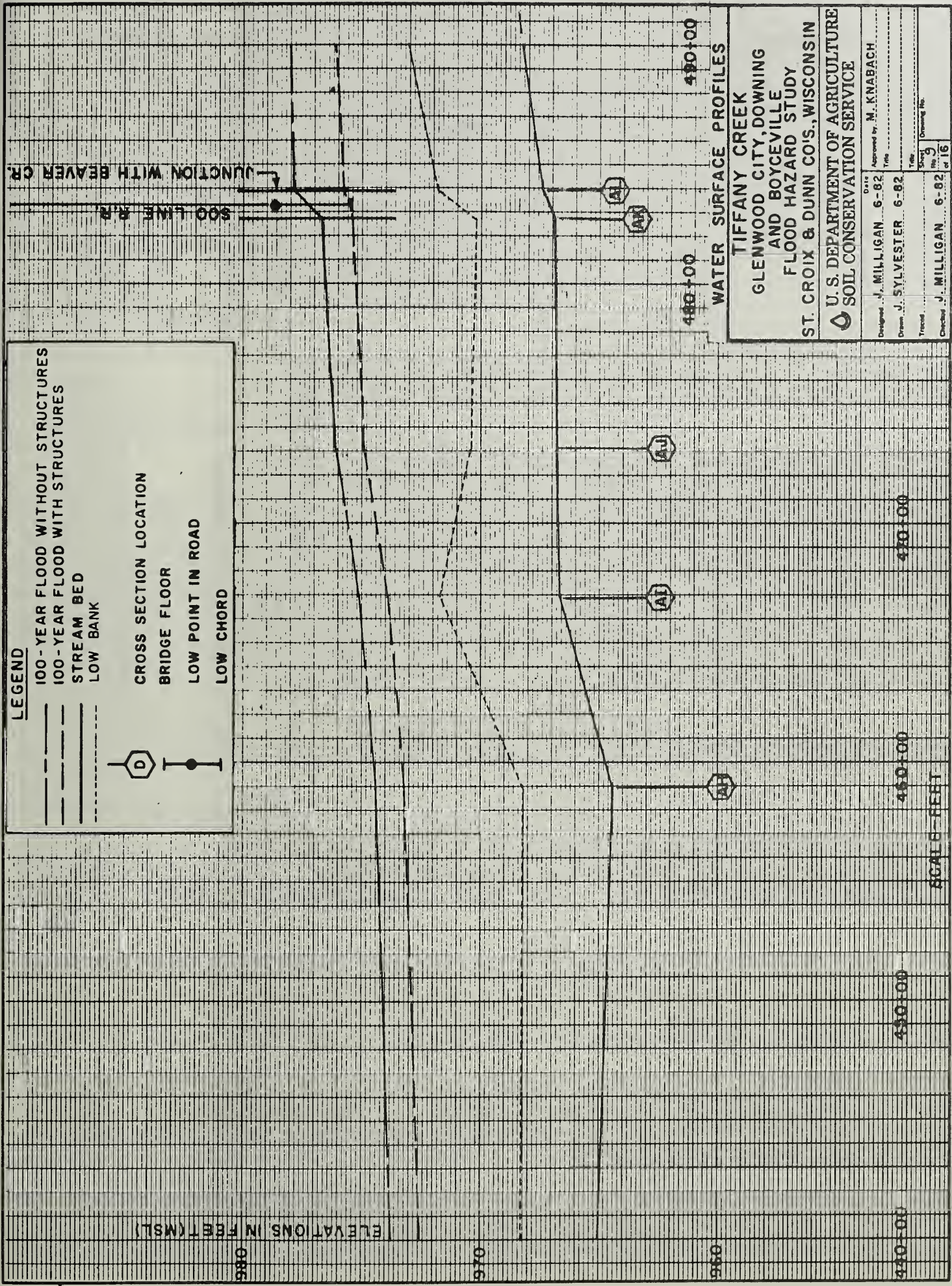
**TIFFANY CREEK**  
**GLENWOOD CITY, DOWNING**  
**AND BOYCEVILLE**  
**FLOOD HAZARD STUDY**  
**ST. CROIX & DUNN CO'S, WISCONSIN**

**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

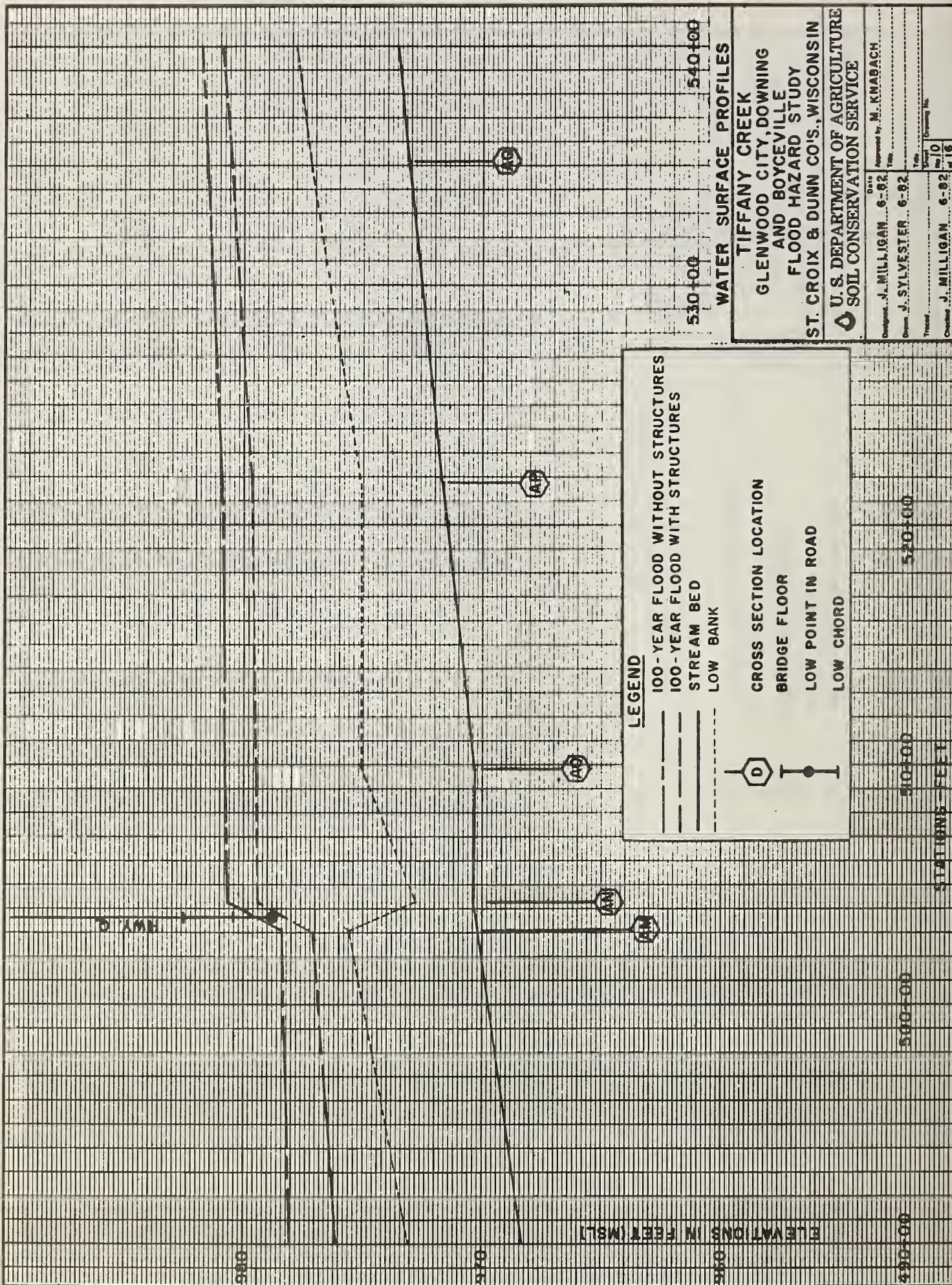
Designed by J. MILLIGAN	Date 6-82	Approved by M. KNABACH
Drawn by J. SYLVESTER	Title	Sheet No. 8
Traced	Checked	of 16
J. MILLIGAN		6-82

SCALE FEET







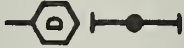




# LEGEND

100-YEAR FLOOD WITHOUT STRUCTURES  
 100-YEAR FLOOD WITH STRUCTURES  
 STREAM BED  
 LOW BANK

CROSS SECTION LOCATION  
 BRIDGE FLOOR  
 LOW POINT IN ROAD  
 LOW CHORD



HWY. 170 AND CORPORATE  
 LIMITS OF DOWNING

ELEVATIONS IN FEET (MSL)

990

980

970

960-00

950-00

940-00

930-00

STATIONS - FEET

540-00

530-00

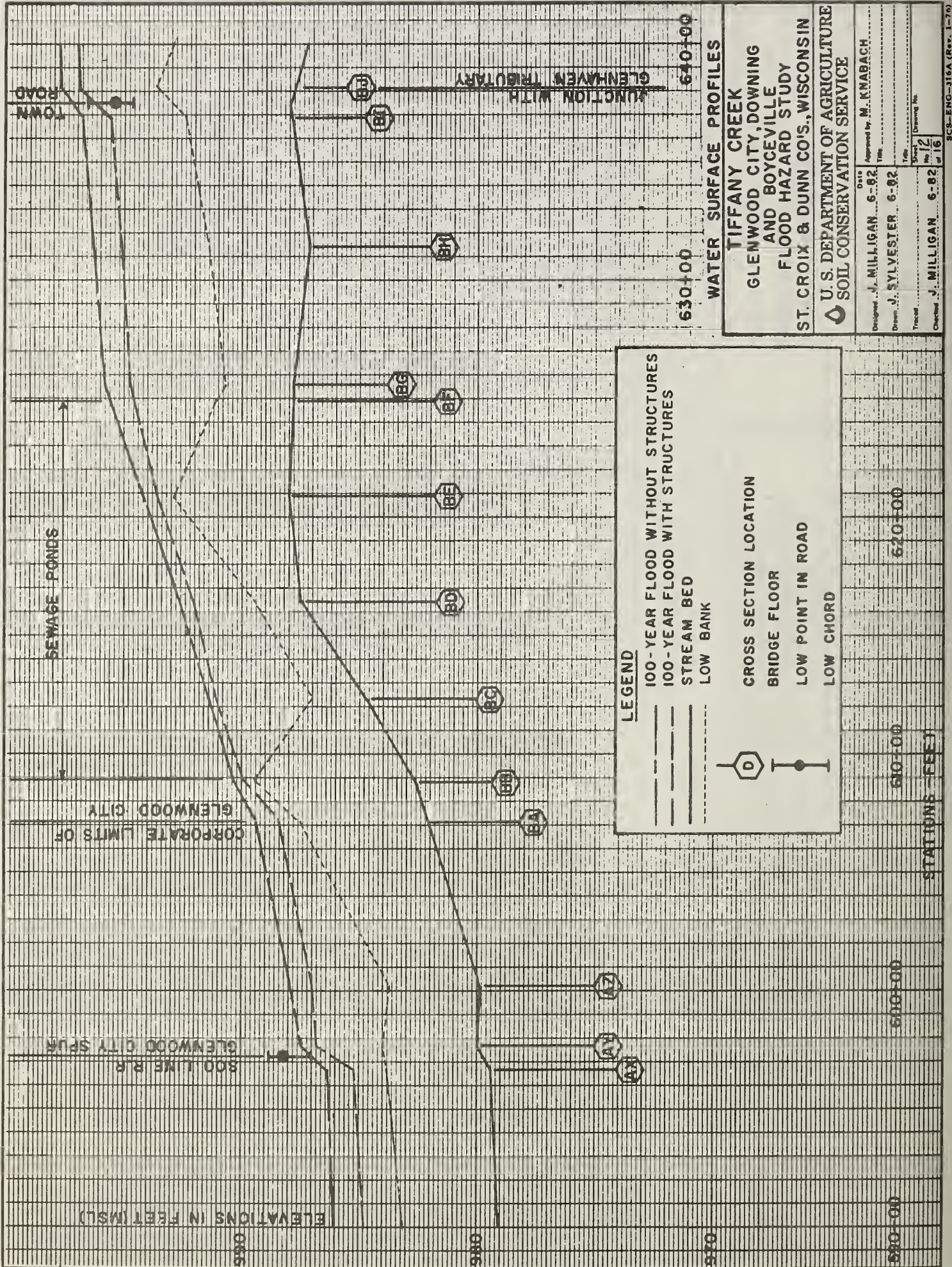
520-00

WATER SURFACE PROFILES

TIFFANY CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S, WISCONSIN  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed by J. MILLIGAN	Date 6-82	Approved by M. KNABACH
Drawn by J. SYLVESTER	Date 6-82	Checked by J. MILLIGAN
Title TIFFANY CREEK FLOOD HAZARD STUDY		Scale 1" = 100'
Project No. 11		Sheet No. 11 of 16

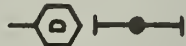




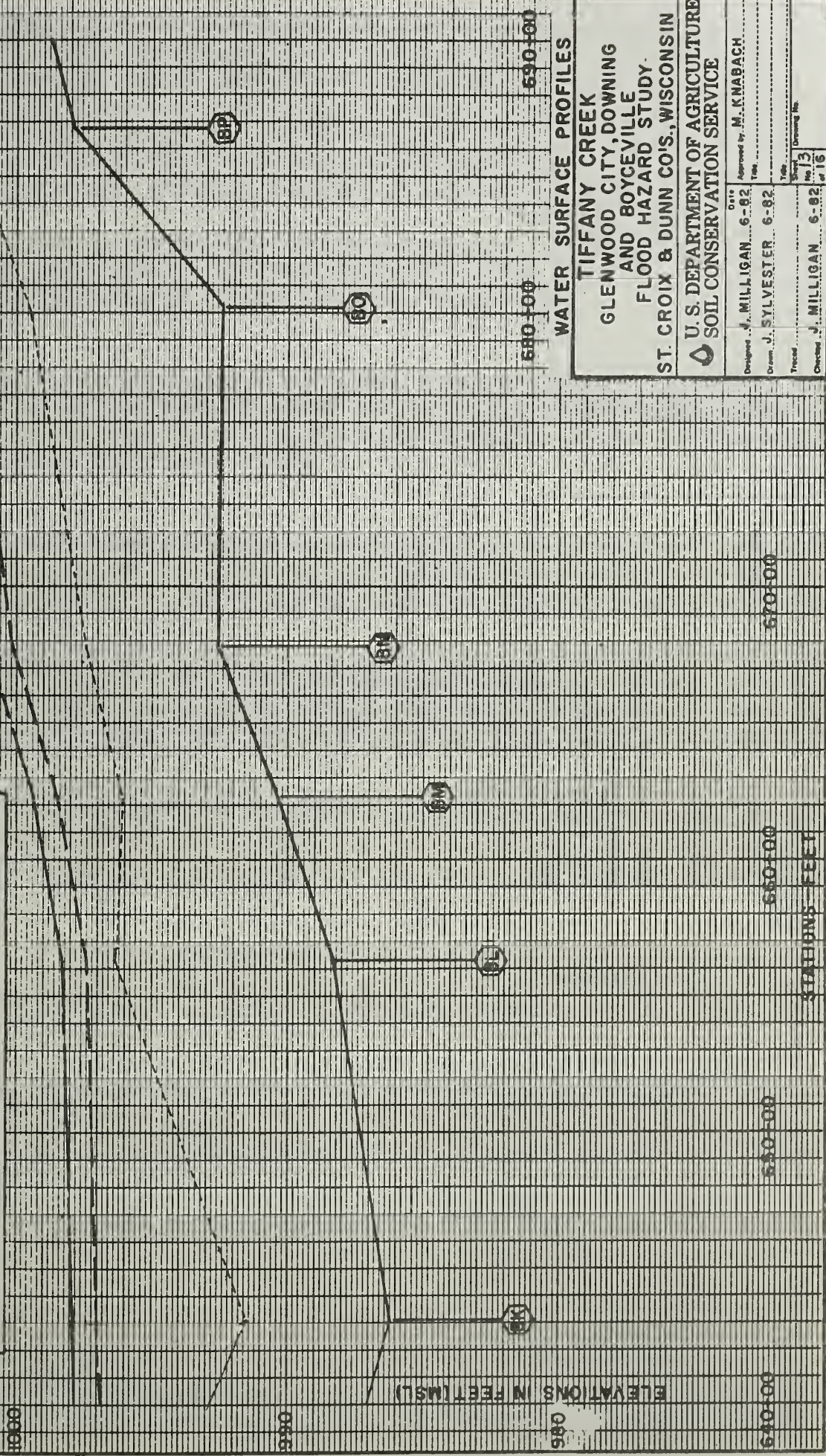


**LEGEND**

- 100-YEAR FLOOD WITHOUT STRUCTURES
- 100-YEAR FLOOD WITH STRUCTURES
- STREAM BED
- LOW BANK



- CROSS SECTION LOCATION
- BRIDGE FLOOR
- LOW POINT IN ROAD
- LOW CHORD



**WATER SURFACE PROFILES**

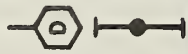
TIFFANY CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S, WISCONSIN  
 U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed by J. MILLIGAN	Date 6-82	Approved by M. KNABACH
Drawn by J. SYLVESTER	Date 6-82	Year
Traced by J. MILLIGAN	Date 6-82	Year
Checked by J. MILLIGAN	Date 6-82	Year
Sheet No. 13		Drawing No. of 16



# LEGEND

100-YEAR FLOOD WITHOUT STRUCTURES  
 100-YEAR FLOOD WITH STRUCTURES  
 STREAM BED  
 LOW BANK



CROSS SECTION LOCATION  
 BRIDGE FLOOR  
 LOW POINT IN ROAD  
 LOW CHORD

OLD MILL DAM EMBANKMENT

WATER SURFACE PROFILES  
 730+00 740+00

TIFFANY CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S, WISCONSIN  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

DATE 6-82  
 DESIGNED BY J. MILLIGAN  
 DRAWN BY J. SYLVESTER  
 CHECKED BY J. MILLIGAN  
 APPROVED BY M. KNABACH  
 TITLE FLOOD HAZARD STUDY  
 SHEET NO. 14  
 DRAWING NO. 16

720+00

710+00

700+00

690+00

STATIONS - FEET

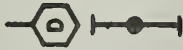
ELEVATIONS IN FEET (MSL)



# LEGEND

100-YEAR FLOOD WITHOUT STRUCTURES  
 100-YEAR FLOOD WITH STRUCTURES  
 STREAM BED  
 LOW BANK

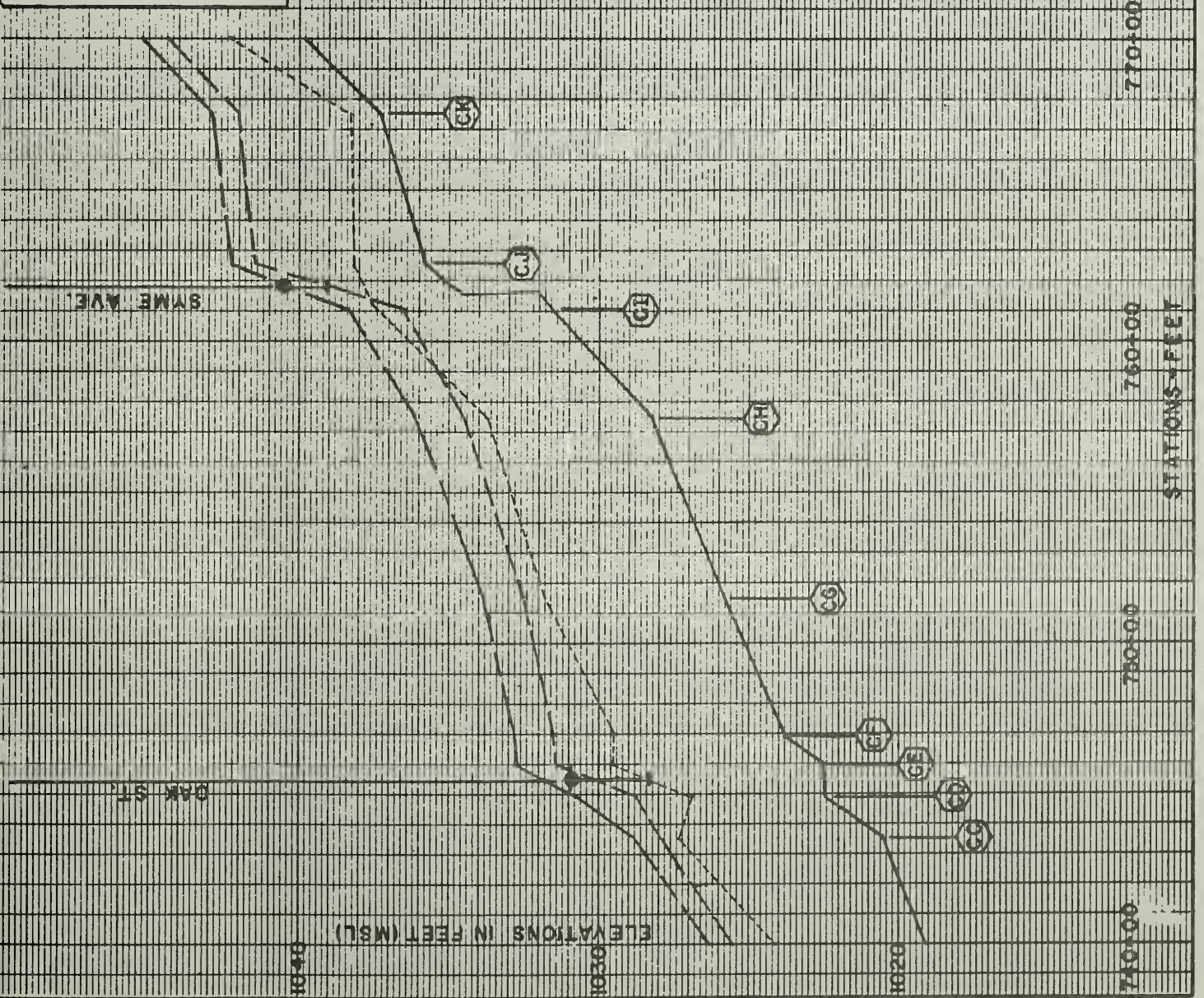
CROSS SECTION LOCATION  
 BRIDGE FLOOR  
 LOW POINT IN ROAD  
 LOW CHORD



## WATER SURFACE PROFILES

TIFFANY CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S., WISCONSIN  
 U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

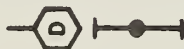
Designed by J. MILLIGAN	Date 6-82	Approved by M. KNABACH
Drawn by J. SYLVESTER	Date 6-82	Checked by J. MILLIGAN
Title		Scale
Drawing No. 15		Sheet No. 15 of 16





# LEGEND

100-YEAR FLOOD WITHOUT STRUCTURES  
 100-YEAR FLOOD WITH STRUCTURES  
 STREAM BED  
 LOW BANK



CROSS SECTION LOCATION  
 BRIDGE FLOOR  
 LOW POINT IN ROAD  
 LOW CHORD

LIMITS OF STUDY

HWY. 6

ELEVATIONS IN FEET (MSL)

770

760

750

770+00

780+00

790+00

800+00

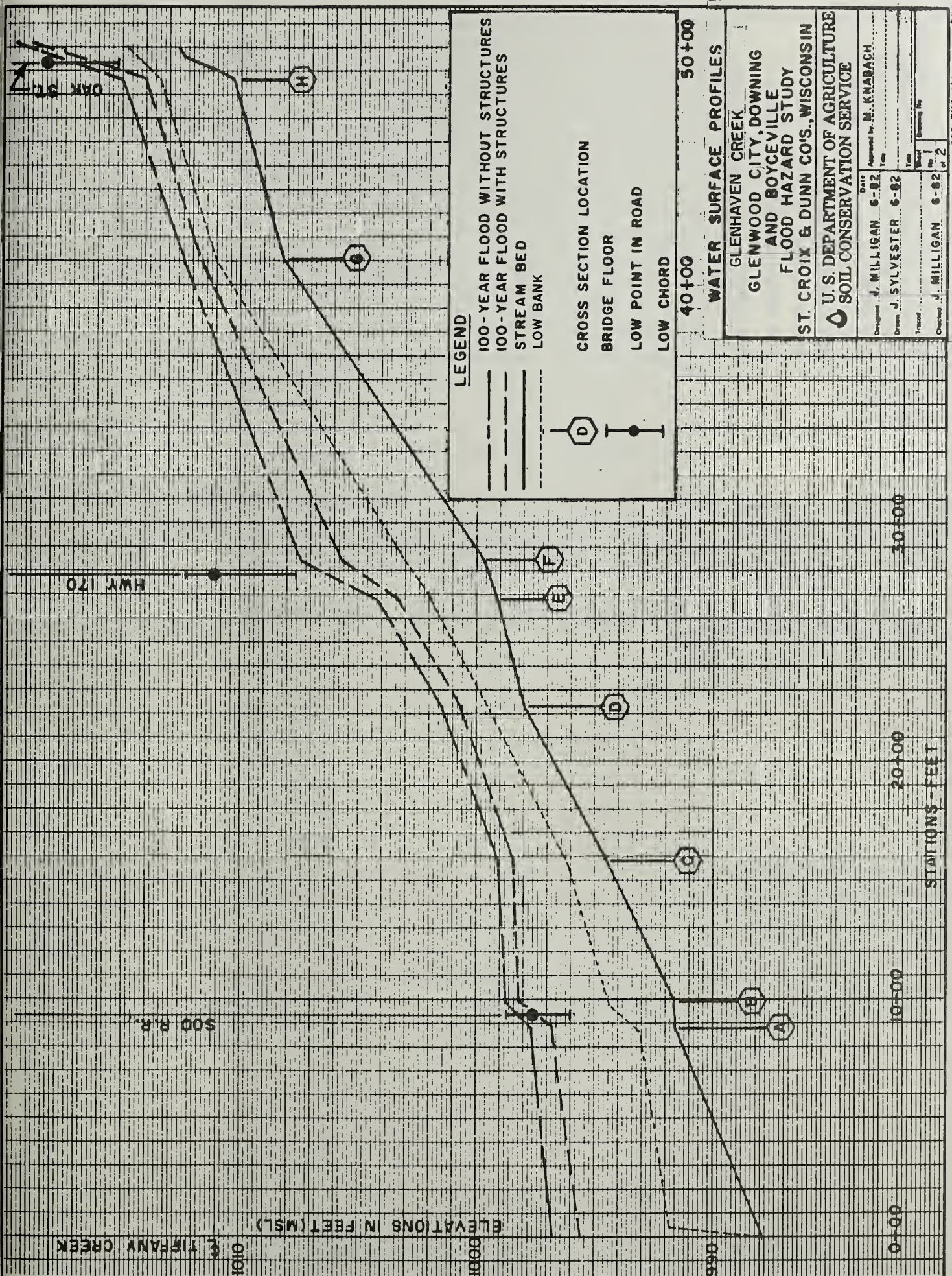
STATION - FEET

## WATER SURFACE PROFILES

TIFFANY CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S, WISCONSIN  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed by	J. MILLIGAN	Date	6-82
Drawn by	J. SYLVESTER	Date	6-82
Traced by	J. MILLIGAN	Date	6-82
Checked by	J. MILLIGAN	Date	6-82
Approved by	M. KNABACH	Date	6-82
Sheet No.	16	of	16



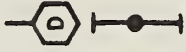




# LEGEND

100-YEAR FLOOD WITHOUT STRUCTURES  
 100-YEAR FLOOD WITH STRUCTURES  
 STREAM BED  
 LOW BANK

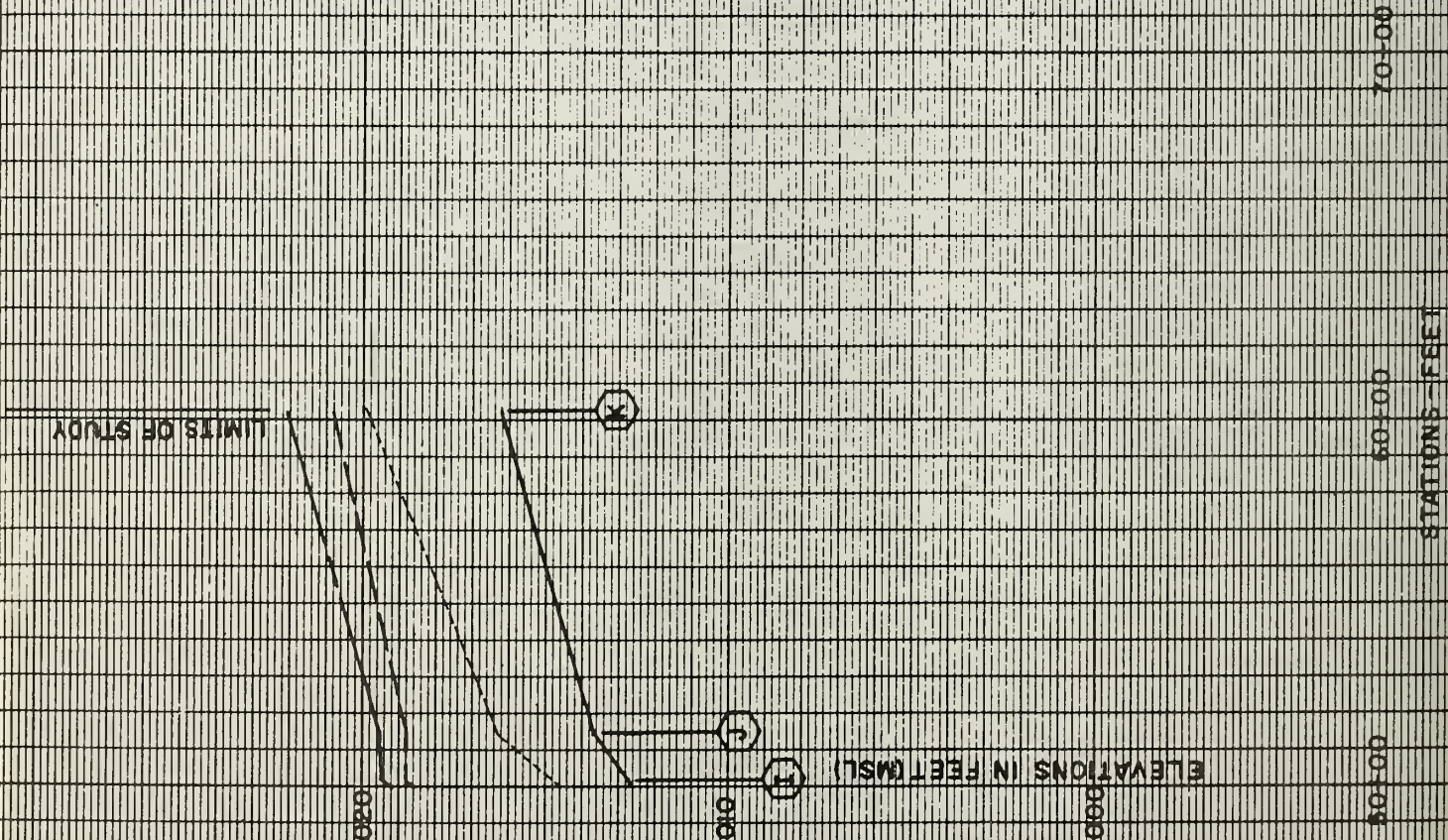
CROSS SECTION LOCATION  
 BRIDGE FLOOR  
 LOW POINT IN ROAD  
 LOW CHQRD



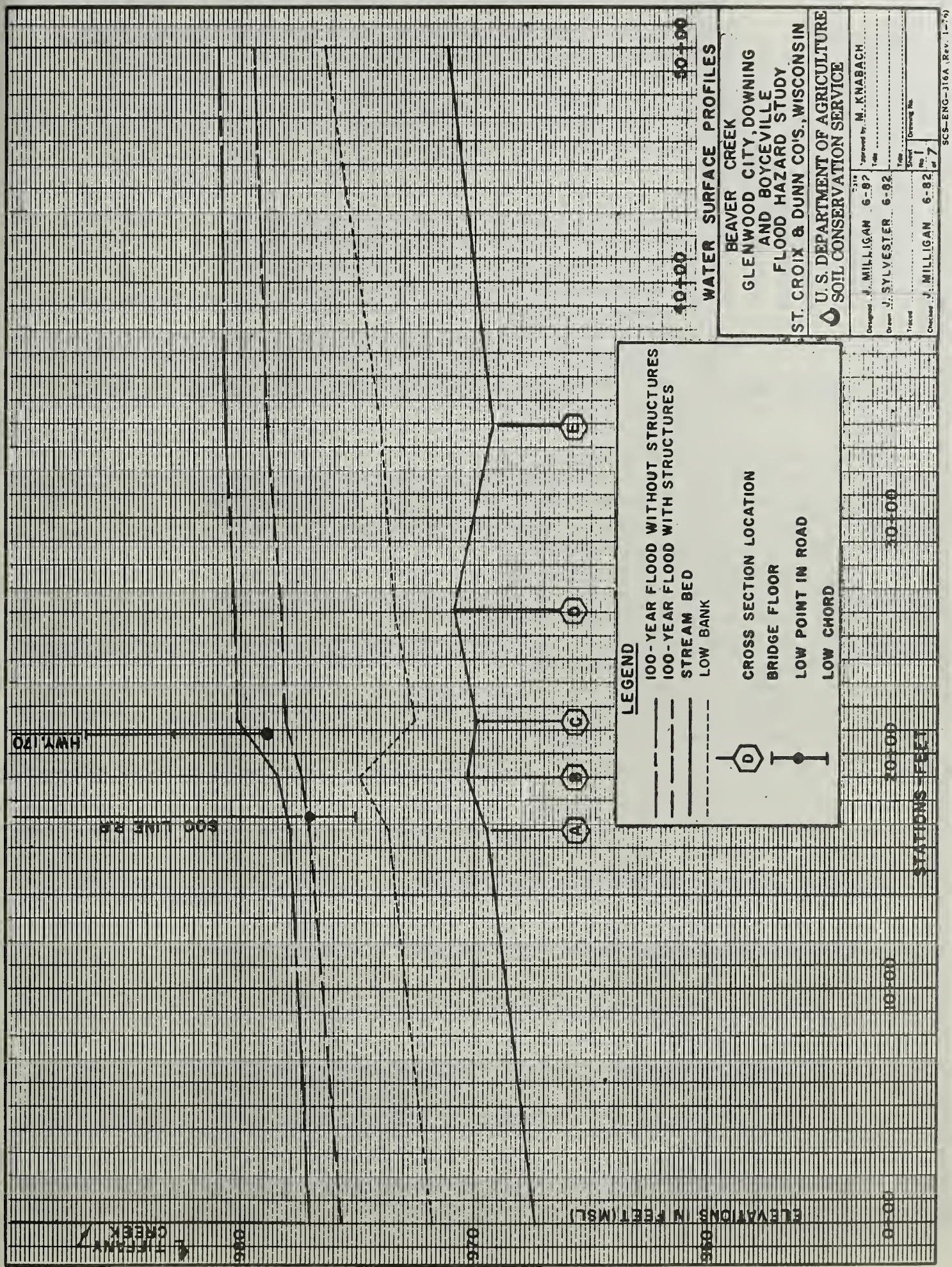
## WATER SURFACE PROFILES

GLENHAVEN CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S, WISCONSIN  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed by J. MULLIGAN, 6-82  
 Drawn by J. SYLVESTER, 6-82  
 Checked by J. MULLIGAN, 6-82  
 Title  
 Date  
 Project No.  
 Sheet No. 2 of 2



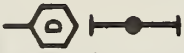






# LEGEND

100-YEAR FLOOD WITHOUT STRUCTURES  
 100-YEAR FLOOD WITH STRUCTURES  
 STREAM BED  
 LOW BANK



CROSS SECTION LOCATION  
 BRIDGE FLOOR  
 LOW POINT IN ROAD  
 LOW CHORD

ELEVATIONS IN FEET (MSL)

990

980

970

960

90+00 100+00

WATER SURFACE PROFILES

BEAVER CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY

ST. CROIX & DUNN CO'S, WISCONSIN

U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed J. MILLIGAN 6-62 Approved by M. KNABACH

Drawn J. SYLVESTER 6-62 Title

Trace Sheet No. 2 of 7

Checked J. MILLIGAN 6-62

SCS-ENG-J16A (Rev. 1-76)

10+00

70+00

60+00

STATIONS - FEET



# LEGEND

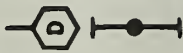
100-YEAR FLOOD WITHOUT STRUCTURES  
 100-YEAR FLOOD WITH STRUCTURES  
 STREAM BED  
 LOW BANK

## CROSS SECTION LOCATION

BRIDGE FLOOR

LOW POINT IN ROAD

LOW CHORD



ELEVATIONS IN FEET (MSL)

990

980

970

100+00

110+00

120+00

130+00

140+00

150+00

## WATER SURFACE PROFILES

BEAVER CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S, WISCONSIN

U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

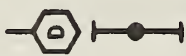
Designer	J. MILLIGAN	Date	6-92	Approved by	M. KNABACH
Drawn	J. SYLVESTER	Date	6-92	Traced	
Checked	J. MILLIGAN	Date	6-92	Sheet	3
				Drawing No.	7

STATIONS - FEET



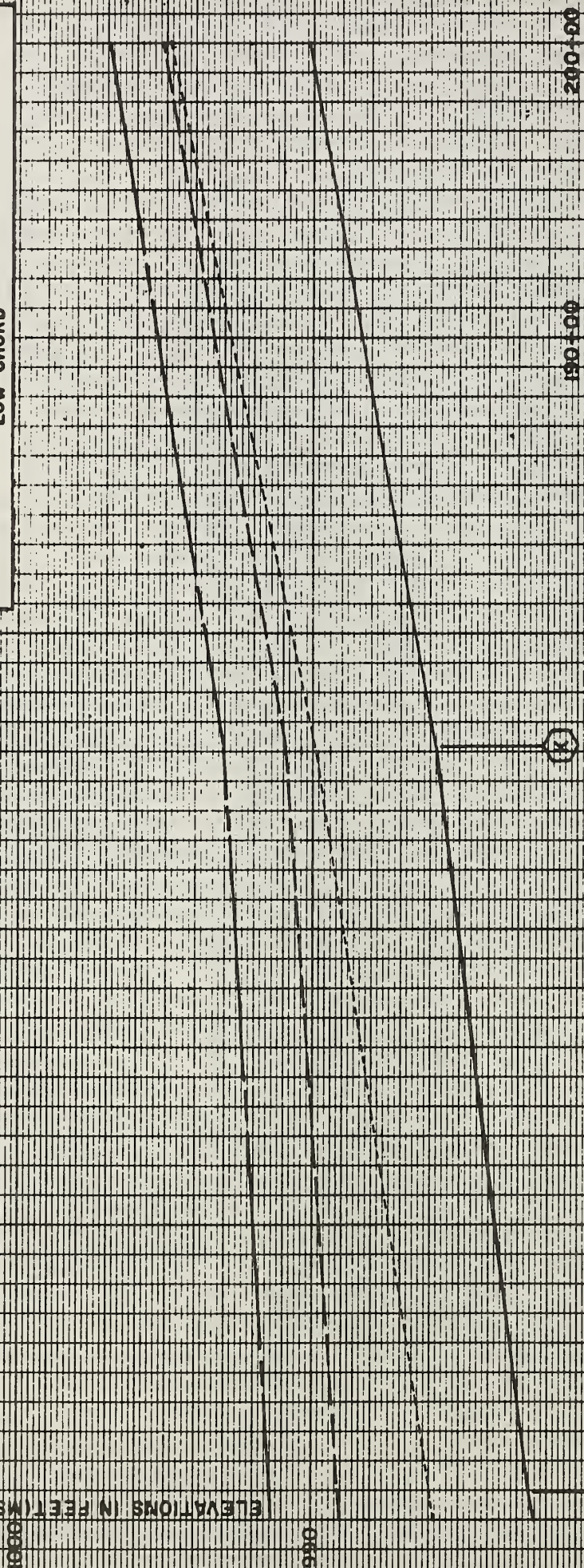
# LEGEND

100-YEAR FLOOD WITHOUT STRUCTURES  
 100-YEAR FLOOD WITH STRUCTURES  
 STREAM BED  
 LOW BANK



CROSS SECTION LOCATION  
 BRIDGE FLOOR  
 LOW POINT IN ROAD  
 LOW CHORD

ELEVATIONS IN FEET (MSL)



## WATER SURFACE PROFILES

BEAVER CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S, WISCONSIN

U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

DATE	6-82	APPROVED BY	M. KNABACH
DESIGNED	J. MILLIGAN	TYPE	
DRAWN	J. SYLVESTER	DATE	6-82
TRACED		SHEET	4
CHECKED	J. MILLIGAN	DRAWING NO.	7



# LEGEND

100-YEAR FLOOD WITHOUT STRUCTURES  
 100-YEAR FLOOD WITH STRUCTURES  
 STREAM BED  
 LOW BANK

CROSS SECTION LOCATION  
 BRIDGE FLOOR  
 LOW POINT IN ROAD  
 LOW CHORD



ELEVATIONS IN FEET (MSL)

C. K. K. 123

STANG ROAD

## WATER SURFACE PROFILES

BEAVER CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S, WISCONSIN

U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed	J. MILLIGAN	6-82	Approved by	M. KNABACH
Drawn	J. SYLVESTER	6-82	Title	
Traced			Sheet	5
Checked	J. MILLIGAN	6-82	Drawing No.	7

210+00

220+00

230+00

240+00

250+00

260+00

STATIONS - FEET



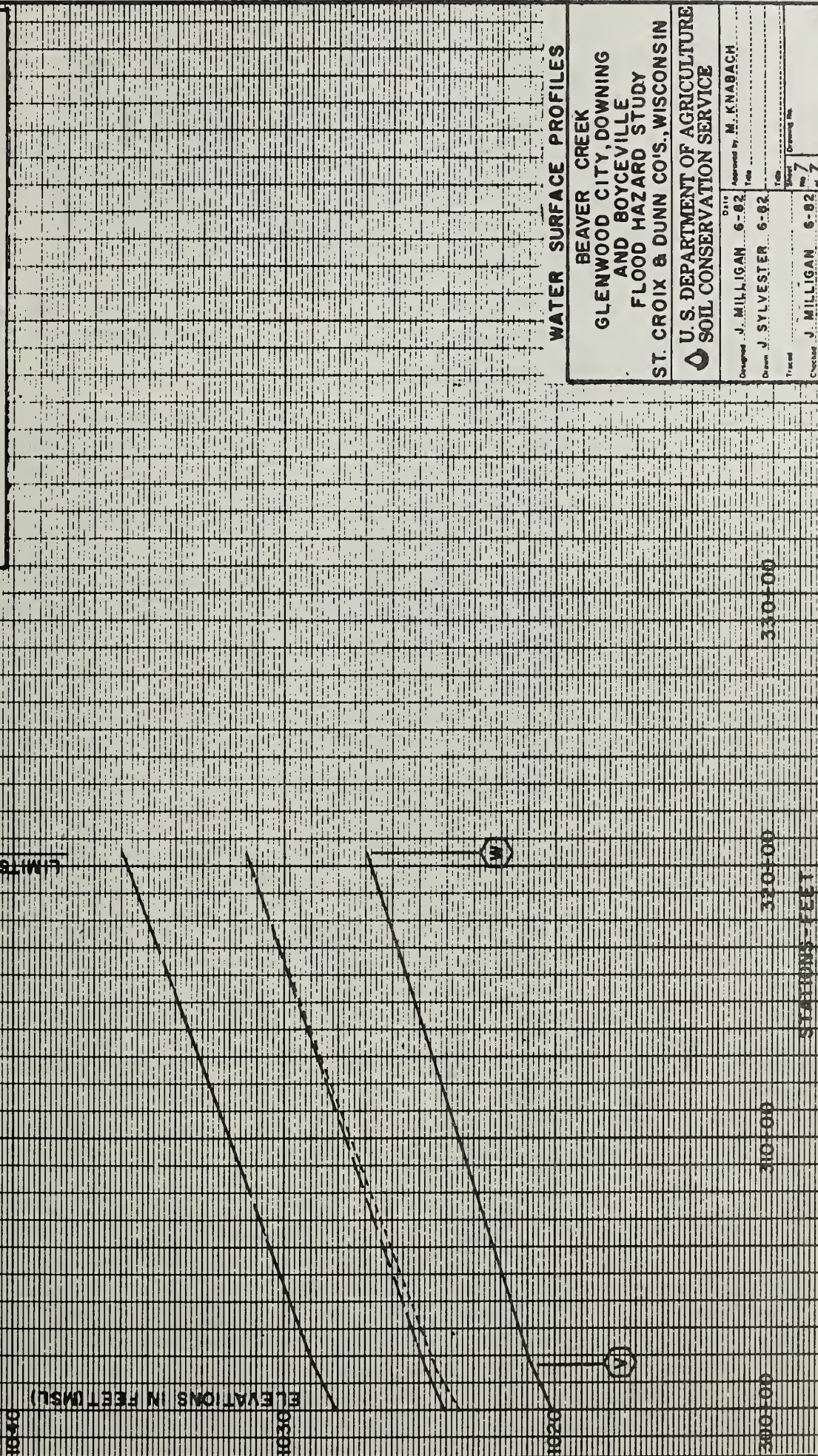
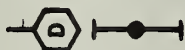




# LEGEND

100-YEAR FLOOD WITHOUT STRUCTURES  
 100-YEAR FLOOD WITH STRUCTURES  
 STREAM BED  
 LOW BANK

CROSS SECTION LOCATION  
 BRIDGE FLOOR  
 LOW POINT IN ROAD  
 LOW CHORD



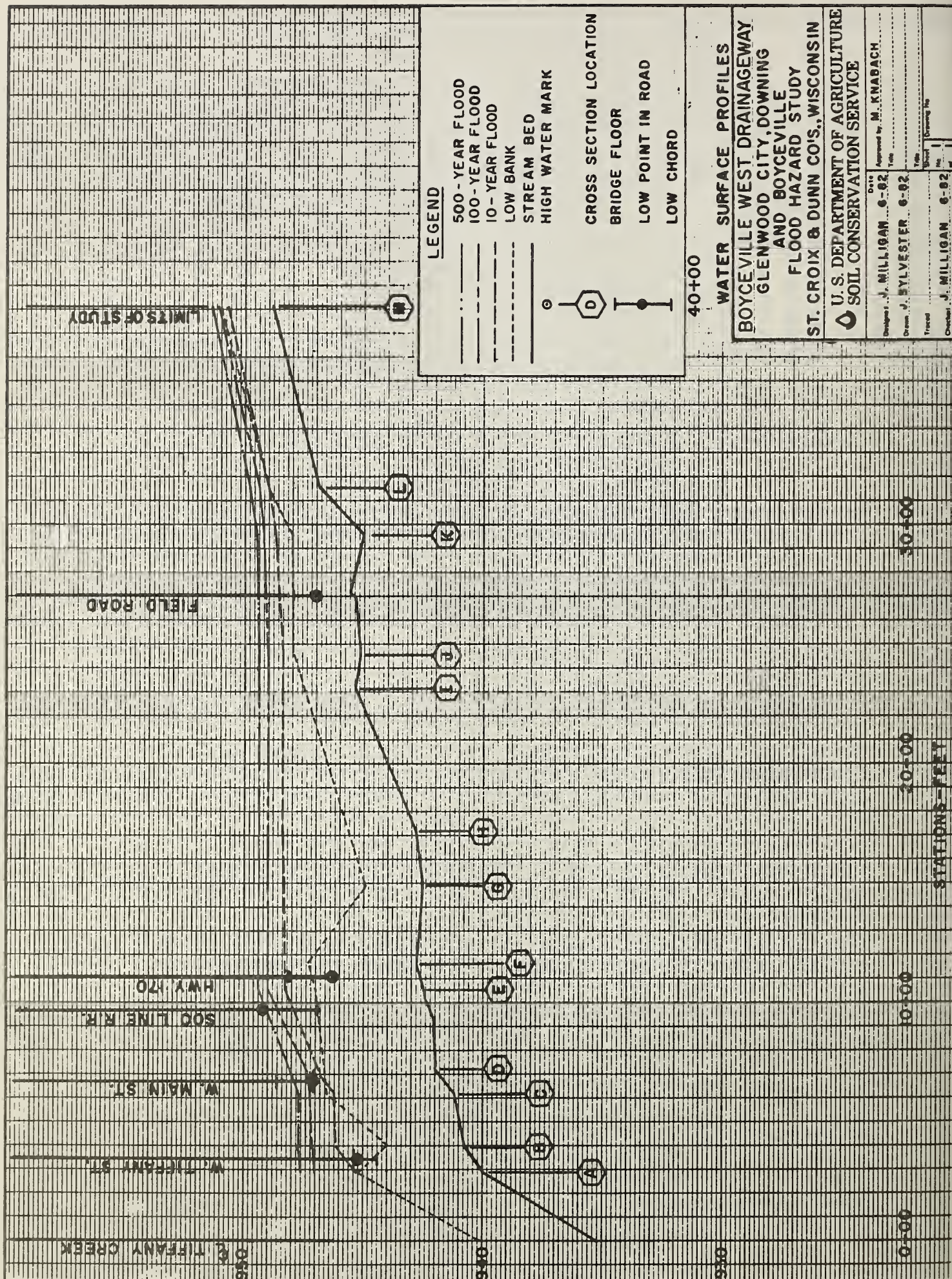
## WATER SURFACE PROFILES

BEAVER CREEK  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S, WISCONSIN

U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed by	J. MILLIGAN	Date	6-82
Drawn by	J. SYLVESTER	Date	6-82
Traced by	J. MILLIGAN	Date	6-82
Checked by	J. MILLIGAN	Date	6-82
Sheet	7	of	7



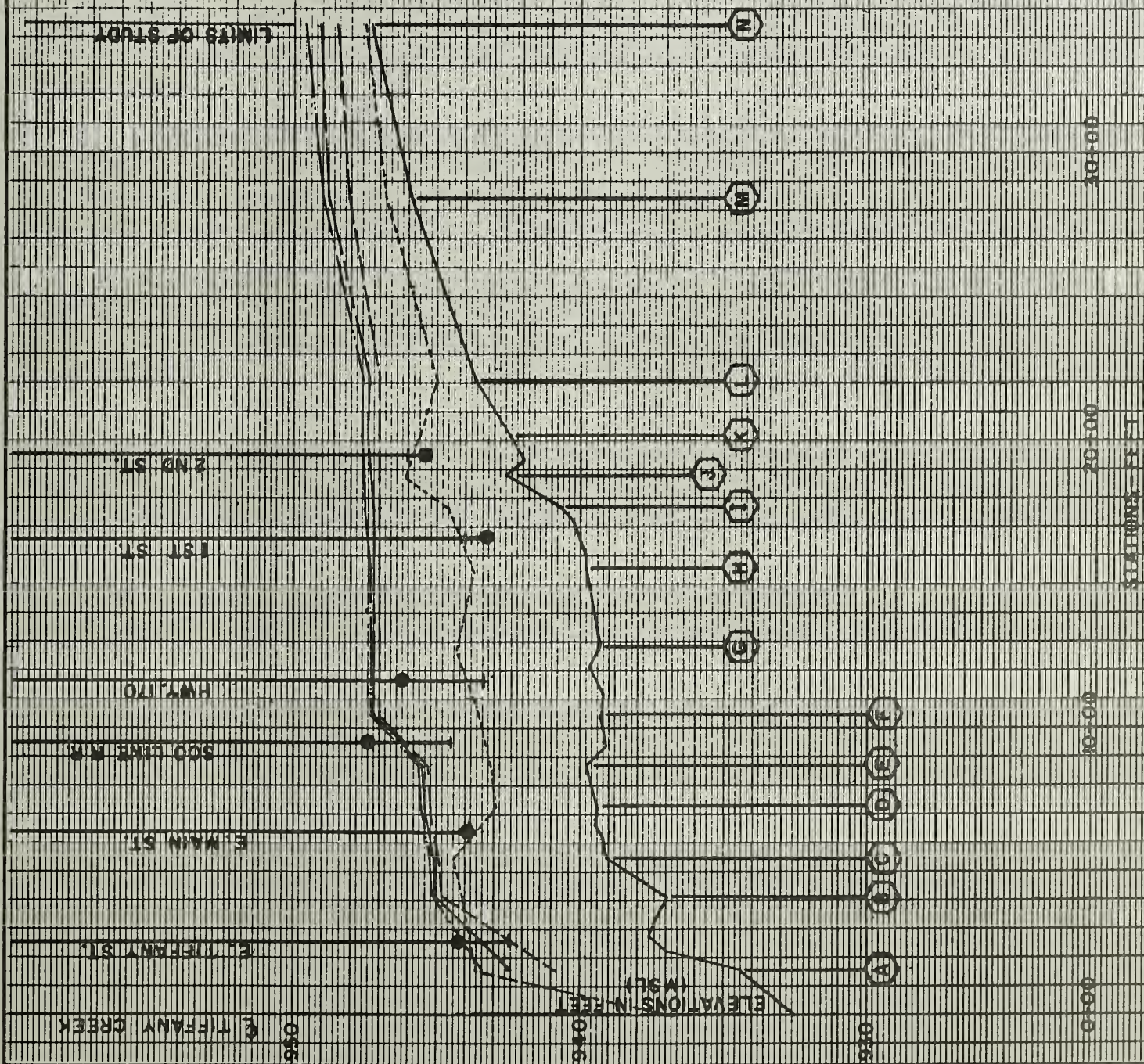




# LEGEND

500-YEAR FLOOD  
100-YEAR FLOOD  
10-YEAR FLOOD  
LOW BANK  
STREAM BED  
HIGH WATER MARK

CROSS SECTION LOCATION  
BRIDGE FLOOR  
LOW POINT IN ROAD  
LOW CHORD









## Appendix C

### TYPICAL SECTIONS





950

945

940

935

930

ELEVATIONS IN FEET (MSL)



DISTANCE IN FEET  
CROSS SECTION F

# LEGEND

- 100 YEAR FLOOD WITHOUT STRUCTURES
- - - 100 YEAR FLOOD WITH STRUCTURES
- GROUND LINE

## TYPICAL CROSS SECTIONS

TIFFANY CREEK  
GLENWOOD CITY, DOWNING  
AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S, WISCONSIN  
U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Designed by	J. MILLIGAN	Date	6-82
Drawn by	J. SYLVESTER	Date	6-82
Checked by	J. MILLIGAN	Date	6-82
Approved by	M. KNABACH	Date	6-82
Project No.	1	Sheet No.	3



ELEVATIONS IN FEET (MSL)

985

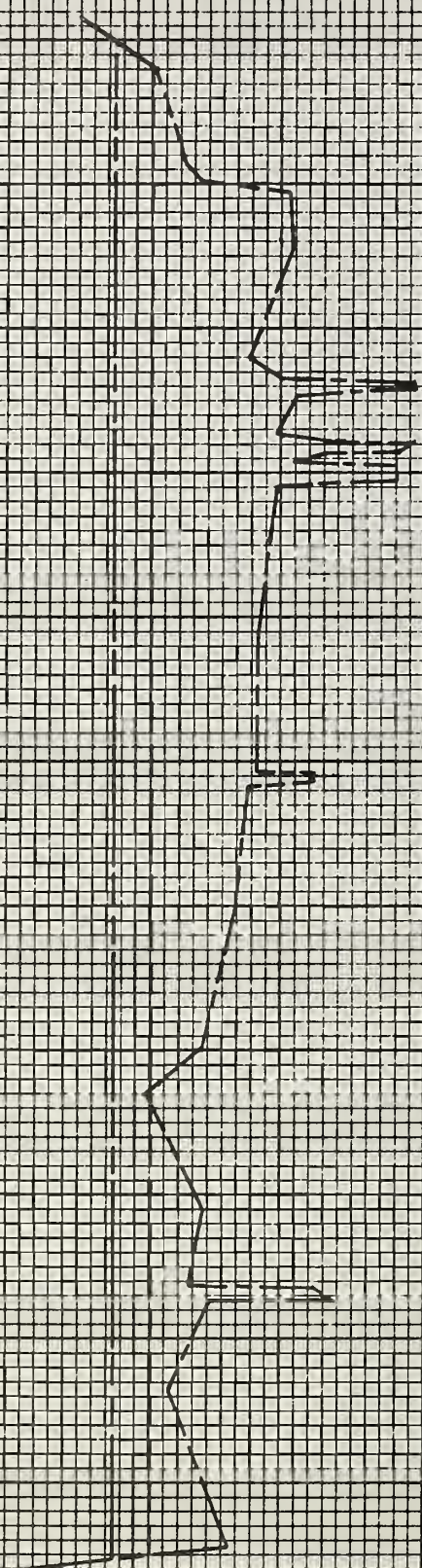
980

975

970

1000 800 600 400 200 0 200 400 600 800 1000 1200

DISTANCE IN FEET  
CROSS SECTION A0



LEGEND

- 100 YEAR FLOOD WITHOUT STRUCTURES
- - - 100 YEAR FLOOD WITH STRUCTURES
- GROUND LINE

TYPICAL CROSS SECTIONS

TIFFANY CREEK  
GLENWOOD CITY, DOWNING  
AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S, WISCONSIN  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Designed by J. MILLIGAN	Date 6-82	Approved by M. KNABACH
Drawn by J. SYLVESTER	Date 6-82	Checked by J. MILLIGAN
Title Flood Hazard Study		Sheet No. 2 of 3





DISTANCE IN FEET  
CROSS SECTION CG

LEGEND

- 100 YEAR FLOOD WITHOUT STRUCTURES
- .-.-.- 100 YEAR FLOOD WITH STRUCTURES
- GROUND LINE

TYPICAL CROSS SECTIONS

TIFFANY CREEK  
GLENWOOD CITY, DOWNING  
AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S, WISCONSIN  
U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Designed by J. MILLIGAN	Date 6-02	Approved by M. KNABACH
Drawn by J. SYLVESTER	Date 6-02	Year
Traced	Scale 1"=50'	Sheet No. 3 of 3
Checked by J. MILLIGAN	Date 6-02	Year





1000 800 600 400 200 0

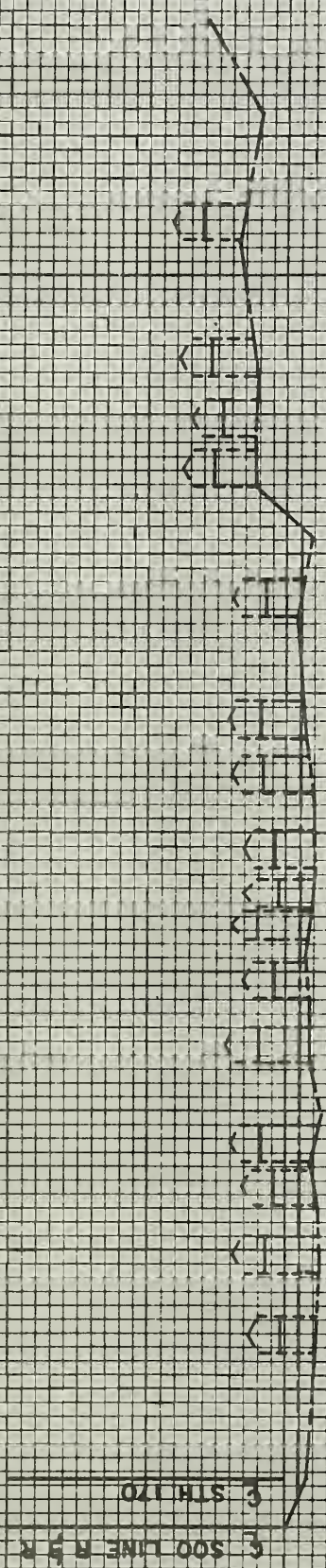
DISTANCE IN FEET  
CROSS SECTION D

LEGEND  
 --- 100 YEAR FLOOD WITHOUT STRUCTURES  
 -.- 100 YEAR FLOOD WITH STRUCTURES  
 --- GROUND LINE

TYPICAL CROSS SECTIONS  
 BEAVER CREEK TRIBUTARY  
 GLENWOOD CITY, DOWNING  
 AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S, WISCONSIN  
 U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Designed by J. MILLIGAN	Date 6-82	Approved by M. KNABACH
Drawn by J. SYLVESTER	Date 6-82	
Traced by J. MILLIGAN	Date 6-82	
Checked by J. MILLIGAN	Date 6-82	





0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200

DISTANCE IN FEET

CROSS SECTION 100 FEET WEST OF C. OF CENTER STREET (CITH K)

**LEGEND**

--- 100-YEAR FLOOD

--- GROUND LINE

BUILDING LOCATION

--- FIRST FLOOR ELEVATION

GLENWOOD CITY, DOWNING  
AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Original: J. MILLIGAN Drawn: W. MILLER Title:	Date: 3-83 Year: 3-83 No.:	Approved by: M. KNABACH Title:
Checked: J. MILLIGAN Date: 3-83 Title:		

ELEVATIONS IN FEET (MSL)







## Appendix D

### LIST OF BENCH MARKS





# Elevation Reference Marks

<u>Reference Mark</u>	<u>Elev. (MSL)</u>	<u>Description</u>
1	1068.43	TBM 5-1. Top of upstream end of 3' by 5' pipe arch culvert under CTH "G". (Glenwood City)
2	1044.63	Top of hydrant on west side of Syme Ave. 250' south of centerline of Highway "128". (Glenwood City)
3	1033.00	Crest of weir of sheet piling drop spillway located app. 40' downstream of Syme Ave. (Glenwood City)
4	1041.60	Top of hydrant of NW corner of Clark and Elm Streets. (Glenwood City)
5	1030.95	TBM B-17. Orange paint spot on top of concrete guard rail base at NW corner of bridge over Tiffany Creek at Oak Street. (Glenwood City)
6	1026.435	L-50 at Glenwood City, St. Croix County, 36.7' west of centerline of railroad tracks, 98.6' southwest of SE corner of Midland Co-op Building a standard disk stamped "L 50 1934" and set in the top of a concrete post.
7	1029.11	TBM 6-4. Top of nail with aluminum disc in 24" dia elm tree located 65' west of road centerline and 36' north of the south line of outlot 34, sec. 23, T. 30 N., R. 15 W. (Glenwood City)
8	1019.79	TBM 6-2. Form nail 1' above ground on north side of 28" oak tree on inside of town road curve.
9	995.06	BM-M-50. About 1.2 miles east along the Soo Line railroad from the station at Glenwood City at mile marker 391.9, 49.2' east of the centerline of a road, 49.4' north of the centerline of the track. A standard disk, stamped "M-50 1934" and set in the top of a concrete post.
10	990.75	TBM #11. Top of bolt head in SE corner of top tressel 2' south of tracks and 3' north of sign 391.12 north of sewage treatment pond.
11	988.77	TBM #13. Top of bolt head on NE corner of RR tressel 1' south of barrel in NE corner and 2' north of RR tracks. Main channel of Tiffany Creek. East of sewage pond.

# Elevation Reference Marks

<u>Reference Mark</u>	<u>Elev. (MSL)</u>	<u>Description</u>
12	988.84	TBM #14. Top of bolt head in SE corner of top of RR trestle. 1' from east end of trestle and 2' south of RR tracks.
13	983.29	BM N 50. At Downing, Dunn County, about 10 rails (400') west of the west line of the Soo Line Railway Station at a road crossing, about 5 rails (200') east of the centerline of the road, 42' north of the centerline of the main track, and 2' southwest of a pole. A standard disk, stamped "N 50 1934" and set in the top of a concrete post.
14	981.30	TBM 20A. Nail in north face of power pole (2HH7) at junction of CTH "Q" and Hwy. 170 on south shoulder of "170" and on centerline of CTH "Q". Nail is 2.3' above ground.
15	978.87	TBMA-20. Form nail set in west side of power pole, 1st pole south of the Soo Line main track crossing CTH "Q" near Downing.
16	977.47	TBM 21. Top of bolt head, colored red, located in southwest corner of first RR trestle east of CTH "Q" and 1.5' south of track and 1.5' from west end of trestle. (Glenwood City Spur)
17	976.91	TBM 22. Top of bolt head, colored red, located in northeast corner of second RR tressel east of CTH "Q" and 1.5' north of track and 1.5' from east end of tressel. (Glenwood City Spur)
18	979.03	TBM 500. Top of concrete abutment of southwest corner of first railroad bridge east of Cty Q in Downing.
19	974.47	TBM 23. Top of bolt head, colored red, located in northeast corner of third RR trestle east of CTH "Q". (Glenwood City Spur)
20	977.58	TBM 24. Red square on northwest corner of concrete base of railroad semaphore signal. West of town road crossing east of Downing.
21	972.90	TBM 25. Form nail in south side of 4th telephone pole west of railroad crossing east of the cemetery, located 6" off ground. Pole is about 50' north of main track.



# Elevation Reference Marks

<u>Reference Mark</u>	<u>Elev. (MSL)</u>	<u>Description</u>
22	965.81	TBM 33A. Form nail 2.5' above ground in power pole located east of Anderson driveway and south of Tiffany Creek.
23	965.24	TBM 33. Nail in west side of power pole which is third one east of intersection of town roads and first one west of log cabin house about 30' south of town road.
24	960.01	TBM 35. Form nail in north side of power pole, 6" above ground located third pole east of transformer pole at intersection of town roads and second pole west of curve in road.
25	957.59	TBM 36. Form nail in west side of telephone pole #10 about 200' east of farm machine shed and 50' from centerline of town road and on fence line.
26	958.91	P-50. About 2.5 miles east along the Soo Line railroad from the station at Downing, Dunn County, about 6 1/2 poles west of milepost 388, at a road crossing, 24' west of the centerline of the road, 44' north of the centerline of the main track, and 12' west of a gatepost. A standard disk, stamped "P50 1934" and set in the top of a concrete post.
27	953.68	TBM 37. Form nail set 0.5' above ground in west side of second power pole north of railroad tracks (Soo Line) approximately 0.25 miles east of mile 388 on Soo Line railroad.
28	952.49	TBM 38. Form nail set in east side, 3" above ground in 12" dia twin bur oak tree, located 15' east of field fence and 300' north of Soo Line tracks.
29	959.36	TBM 39. Top of hydrant located on west side of Duffy Street 100' north of Soo Line tracks.
30	954.84	TBM 40. Top of hydrant on north side of Main Street, 110' east of West Street. (Boyceville)
31	952.82	TBM 41. Top of hydrant on north of Main Street, second hydrant east of West Street. (Boyceville)
32	951.29	TBM 42. Top of hydrant on north side of Main Street, third hydrant east of West Street. (Boyceville)

# Elevation Reference Marks

<u>Reference Mark</u>	<u>Elev. (MSL)</u>	<u>Description</u>
33	951.00	TBM 43. Top hydrant on north side of Main Street. First hydrant west of Stanley Street. (Boyceville)
34	950.13	TBM 44. Top of hydrant on north side of Main Street. First hydrant east of Stanley Street. (Boyceville)
35	950.79	TBM 45. Top of hydrant on north side of Main Street. First hydrant east of Ash Street. (Boyceville)
36	950.83	TBM 46. Top of hydrant on NE corner of Center and Main Street. (Boyceville)
37	947.99	TBM 47. Top of fire hydrant SE corner of Tiffany and Center Streets. (Boyceville)
38	950.30	TBM 48. Top of fire hydrant, SE corner of Tiffany and Race Streets. (Boyceville)
39	950.04	TBM 49. Top of fire hydrant, SE corner of Tiffany and Winter Streets. (Boyceville)
40	947.86	TBM 50. Top of fire hydrant, SE corner of Tiffany Street and Hwy. 79. (Boyceville)
41	947.41	TBM 51. Top of fire hydrant located north of intersection of Tiffany and Wilson Streets. (Boyceville)
42	947.00	TBM 52. Top of first fire hydrant east of Wilson Street on the north side of Tiffany Street. (Boyceville)
43	947.11	TBM 53. Top of second fire hydrant east of Wilson Street on the north side of Tiffany Street. (Boyceville)
44	944.83	TBM 54. Top of third fire hydrant east of Wilson Street and on the north side of Tiffany Street. (Boyceville)
45	944.22	TBM 55. Forming nail 1' above ground on east side of power pole. Located at road corner at sewage pump plant. Pole on southeast side of corner. (Boyceville)



# Elevation Reference Marks

<u>Reference Mark</u>	<u>Elev. (MSL)</u>	<u>Description</u>
46	942.02	BM R50. About 2 miles east along the Soo Line tracks from the station at Boyceville, Dunn County, 31' east of the centerline of a road, 27' south of the centerline of the main track, and 12' north of a pole. A standard disk, stamped "R50 1934" and set in the top of a concrete post.
47	1027.27	TBM 10-1. Form nail set 6" above ground in east side of power pole. Located approximately 60' upstream of Overholt driveway and 60' left of Beaver Creek.
48	1025.82	TBM 10-2. Form nail set 6" above ground in NW side of power pole. Located in fence line. Third pole downstream from Jim Overholt driveway.
49	1019.40	TBM 10-3. Orange cross on top of left downstream abutment under guardrail. (Bridge on Rustic Road No. 4)
50	1018.95	TBM 10-4. Form nail 6" above ground in west side of power pole with transformer, across road from V. (Benoy driveway)
51	1011.02	TBM 10-4A. NE corner of concrete pump platform. Located in Emil Stang front yard.
52	1011.98	TBM 10-5. Orange mark on top of curb, right upstream corner of bridge on Stang Road, over Beaver Creek.
53	998.59	TBM 10-6. Nail in south side of 18" dia. elm tree. Southernmost tree in row. 900' west of CTH "W" and 670' north of Stang Road.
54	1001.86	TBM 10-7A. State of Wisconsin, Department of Transportation aluminum disc set in concrete on top of southeast end of abutment of bridge located on CTH "W", Beaver Creek.
55	995.26	TBM 10-10. Nail in bottom of west side of first power pole east of intersection of Highways Q and W.
56	981.21	TBM 10-11. Nail in SE side of first power pole south of General Telephone pedestal number 1265, west side of CTH-"W".

# Elevation Reference Marks

<u>Reference Mark</u>	<u>Elev. (MSL)</u>	<u>Description</u>
57	954.23	TBM 40A. Form nail in 8" dia. white oak tree, 6" above ground in north side. Tree is 750' west of TBM-40 (RM 30) in railroad right-of-way fence.
58	950.44	Top of first fire hydrant west of Highway "K" south side of Highway "170" (by municipal park). (Boyceville)
59	961.67	Top of second fire hydrant west of Highway "K" south of Highway "170" (Lutheran church). (Boyceville)
60	950.60	Top of first fire hydrant from Highway "170" going south on "K". (Boyceville)
61	949.78	Top of second fire hydrant from Highway "170" going south on "K". (Boyceville)
62	950.40	Top of third fire hydrant from "170" going south on "K" (by Catholic church). (Boyceville)
63	951.80	Top of fourth fire hydrant from "170" going south on "K". (Boyceville)
64	952.42	Top of fire hydrant on east end of north trailer court. (Boyceville)
65	954.58	Top of fire hydrant in south trailer court, 30' south of centerline of John Street on east end of trailer court. (Boyceville)
66	950.01	Top of fire hydrant at the southwest corner of Race and Second Streets. (Boyceville)
67	949.34	Top of fire hydrant at northwest corner of Winter and Second Streets. (Boyceville)
68	950.32	Top of fire hydrant on north side of Second Street between Winter and East Streets. (Boyceville)
69	948.87	Top of fire hydrant at northwest corner of East and First Streets. (Boyceville)
70	943.34	Top of concrete at centerline of middle upstream abutment of bridge on East Main Street. (Boyceville)
71	945.16	Top of concrete on the southeast corner of bridge (bridge on Tiffany West Street). (Boyceville)



Appendix E

TABULATION OF  
WATER SURFACE ELEVATIONS  
DISCHARGES





Flooding Source		Discharge - Elevation			
Cross-section	Distance <sup>1/</sup>	100 - Year - With Structure		100 - Year - Without Structures	
Tiffany Creek		Q - CFS	Elev. - MSL	Q - CFS	Elev. - MSL
A	6160	9217	938.6	15466	939.4
B	7810	9217	940.8	15466	942.5
C	9690	9217	942.5	15466	944.2
D	10670	9217	943.5	15466	944.9
E	10740	State Highway 79			
F	10790	9217	945.9	15466	946.6
G	11800	9217	946.0	15466	946.9
H	12900	8725	946.3	15694	947.3
I	13710	8725	947.0	15694	948.5
J	14810	8725	947.4	15694	949.1
K	15970	8725	948.4	15694	950.1
L	16930	8725	949.7	15694	951.5
M	17760	8725	950.7	15694	952.5
N	18630	8725	952.0	15694	953.7
O	18700	Duffy Street			
P	18750	8725	954.2	15690	955.3
Q	20700	8725	955.0	15694	956.5
R	22710	8725	956.1	15694	957.7
S	24780	8300	958.4	15998	959.9
T	26040	8300	959.4	15998	961.0
U	26110	Town Road			
V	26160	8300	960.3	15998	961.6
	28170	8300	961.6	15998	963.0
	28290	8300	961.6	15998	963.0
	28340	R. A. Ebersold Driveway			
	28390	8300	962.2	15998	963.6

<sup>1/</sup> Distance in feet from confluence with Hay River

TABLE 1

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

DISCHARGE - ELEVATION DATA

TIFFANY CREEK

Flooding Source		Discharge - Elevation			
Cross-section	Distance <sup>1/</sup>	100 - Year - With Structure		100 - Year - Without Structures	
Tiffany Creek (cont.)		Q - CFS	Elev. - MSL	Q - CFS	Elev. - MSL
W	32710	8300	964.9	15998	966.2
X	34460	8300	966.3	15998	967.7
Y	34510	S. Anderson Driveway			
Z	34560	8300	966.6	15998	968.1
	35740	8583	967.2	16112	968.7
AA	36670	8583	967.7	16264	969.2
AB	37910	8583	968.2	16416	969.6
AC	38960	8583	968.3	16492	969.8
AD	39950	8588	969.7	16568	971.1
AE	41990	8588	970.9	16644	972.2
AF	42790	8664	971.6	16720	972.8
AG	43530	8740	972.4	16872	973.6
AH	45900	8816	973.2	16948	974.4
AI	46690	8816	973.9	17024	975.1
AJ	47310	8864	974.9	17084	976.1
AK	48270	8864	975.4	16859	976.7
AL	48330	Soo Line Railroad			
AM	48390	6700	975.8	16260	977.9
AN	50310	4068	977.1	5625	978.4
	50370	County Highway "Q"			
AO	50430	4068	979.4	5625	980.7
AP	50991	4068	979.5	5625	980.8
AQ	52180	4068	979.7	5625	980.9
AR	53520	3450	980.5	6238	981.5
	54845	3450	981.5	6238	982.3

<sup>1/</sup> Distance in feet from confluence with Hay River

TABLE 1

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

DISCHARGE - ELEVATION DATA

TIFFANY CREEK



Flooding Source		Discharge - Elevation			
Cross-section	Distance <sup>1/</sup>	100 - Year - With Structure		100 - Year - Without Structures	
Tiffany Creek (cont.)		Q - CFS	Elev. - MSL	Q - CFS	Elev. - MSL
AS	55485	3450	981.9	6238	982.7
	55565	State Highway "170"			
AT	55645	3450	984.1	6238	985.5
AU	56485	3525	984.2	6300	985.6
AV	57430	3600	984.4	6450	985.7
AW	58830	3675	984.8	6600	986.0
AX	59670	3750	985.2	6750	986.3
	59720	Soo Line Railroad (Glenwood City spur)			
AY	59770	3750	986.8	6750	987.5
AZ	60020	3750	987.0	6750	987.9
BA	60710				
BB	60885	3750	988.4	6750	989.4
BC	61236	4125	989.9	7125	990.3
BD	61641	3918	991.1	7163	991.4
BE	62096	3918	992.1	7163	992.6
BF	62493	3918	993.6	7163	994.2
BG	62553	3918	994.6	7163	995.6
BH	63143	3918	994.7	7163	995.8
BI	63693	3918	995.1	7163	996.3
	63743	Town Road	995.6	7163	996.8
BJ	63803	3918	996.9	7163	997.7
BK	64303	3593	997.0	6563	997.9
BL	65633	3593	997.4	6563	998.3
BM	66233	3593	998.5	6563	999.4
BN	66783	3593	1000.1	6563	1001.1

<sup>1/</sup> Distance in feet from confluence with Hay River

TABLE 1

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

DISCHARGE - ELEVATION DATA

TIFFANY CREEK

Flooding Source		Discharge - Elevation			
Cross-section	Distance <u>1/</u>	100 - Year - With Structure		100 - Year - Without Structures	
<u>Tiffany Creek (cont.)</u>		Q - CFS	Elev. - MSL	Q - CFS	Elev. - MSL
B0	68023	3593	1001.7	6563	1002.7
BP	68683	1350	1002.3	2148	1003.1
BQ	69103	1350	1003.2	2148	1003.9
BR	69713	1350	1004.6	2148	1005.4
BS	69973	1350	1007.5	2148	1007.9
BT	70493	1350	1009.1	2148	1009.6
BU	70943	1350	1010.4	2148	1011.1
BV	71543	1343	1013.4	2138	1014.0
BW	72113	1343	1016.6	2521	1017.3
BX	72633	1343	1018.9	2521	1019.9
BY	72673	1343	1019.0	2521	1019.9
BZ	72773	1343	1019.9	2521	1021.5
CA	73323	1343	1021.5	2521	1022.6
CB	73883	1343	1024.8	2521	1025.4
CC	74353	1343	1027.9	2521	1028.8
CD	74493	1343	1028.7	2521	1030.7
CE	74543	Oak Street			
CF	74593	1343	1031.4	2521	1032.7
CG	74693	1343	1031.5	2521	1032.8
CH	75143	1343	1032.5	2521	1033.8
CI	75743	1343	1034.5	2521	1036.1
CJ	76103	1200	1036.5	2475	1038.3
CK	76169	Syme Avenue			
	76245	1200	1041.5	2475	1042.2
	76745	1196	1042.0	2417	1042.9

1/ Distance in feet from confluence with Hay River

TABLE 1	U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE GLENWOOD CITY, DOWNING AND BOYCEVILLE FLOOD HAZARD STUDY ST. CROIX & DUNN CO.'S., WISCONSIN		DISCHARGE - ELEVATION DATA	
			TIFFANY CREEK	



Flooding Source		Discharge - Elevation			
Cross-section	Distance <sup>1/</sup>	100 - Year - With Structure		100 - Year - Without Structures	
Tiffany Creek (cont.)		Q - CFS	Elev. - MSL	Q - CFS	Elev. - MSL
CL	77735	1196	1051.2	2417	1052.0
CM	78395	1196	1057.3	2417	1058.4
CN	79295	534	1062.8	2100	1064.3
CO	79695	534	1067.6	2100	1069.4
	79770	County Highway "G"			
CP	79880	333	1070.9	1310	1071.7
CQ	80080	333	1071.8	1310	1072.7
<sup>1/</sup> Distance in feet from confluence with Hay River					

TABLE 1

U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE  
 GLENWOOD CITY, DOWNING AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S., WISCONSIN

DISCHARGE - ELEVATION DATA

TIFFANY CREEK

Flooding Source		Discharge - Elevation		
Cross-section	Distance <sup>1/</sup>	100 - Year - With Structure	100 - Year - Without Structures	
<u>Glenhaven Creek</u>		Q - CFS	Elev. - MSL	Q - CFS
A	885	576	996.8	1398
B	935	Soo Line Railroad spur to Glenwood City		
C	995	576	998.2	1398
D	1585	555	998.4	1341
E	2235	518	1000.7	1322
	2685	463	1003.3	1302
F		State Highway "170"		
G	2845	463	1005.7	1302
H	4105	426	1011.6	1283
	4865	352	1014.0	1265
I	4936	Oak Street		
J	5017	352	1018.8	1265
K	5147	296	1018.8	1226
	6027	241	1020.8	1207
<sup>1/</sup> Distance in feet from confluence with Tiffany Creek				
				Elev. - MSL
				997.7
				998.7
				999.1
				1001.5
				1004.2
				1007.4
				1012.4
				1015.0
				1019.5
				1019.5
				1022.1

TABLE 1

U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE  
 GLENWOOD CITY, DOWNING AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S., WISCONSIN

DISCHARGE - ELEVATION DATA

GLENHAVEN CREEK



Flooding Source		Discharge - Elevation			
Cross-section	Distance $\frac{1}{2}$	100 - Year - With Structure		100 - Year - Without Structures	
Beaver Creek		Q - CFS	Elev. - MSL	Q - CFS	Elev. - MSL
A	1680	3350	977.1	7666	977.9
B	1730	Soo Line Railroad spur to Glenwood City			
	1900	3350	977.4	7666	978.4
C	2085	State Highway "170"			
D	2135	3350	978.1	7660	980.1
E	2605	3520	978.3	7800	980.3
F	3395	3691	978.9	8000	980.7
G	5935	3863	979.9	8200	981.4
H	7895	3978	981.7	8361	983.1
	10855	4033	984.8	8361	986.5
I	10905	County Highway "Q"			
J	10955	4033	987.2	8361	989.2
K	15095	2247	989.1	7739	991.4
L	17615	1700	990.9	7850	993.0
	20135	1668	995.4	7956	997.2
M	20415	County Highway "W"			
N	20465	1668	997.8	7410	1002.0
O	21745	1605	998.8	8170	1002.5
	24665	999	1004.5	7162	1008.3
P	24725	Stang Road			
Q	24965	999	1005.6	7162	1010.5
R	25845	999	1007.7	7162	1012.0
	27485	1008	1014.4	7162	1017.6
S	27545	Town Road (Rustic road no. 4)			
T	27605	1008	1017.2	7162	1019.3
	27965	882	1017.3	7400	1019.5
U	29005	882	1019.8	7600	1023.1
$\frac{1}{2}$ Distance in feet from confluence with Tiffany Creek					

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

TABLE 1

DISCHARGE - ELEVATION DATA

BEAVER CREEK

Flooding Source		Discharge - Elevation			
Cross-section	Distance <sup>1/</sup>	100 - Year - With Structure		100 - Year - Without Structures	
Beaver Creek (cont)		Q - CFS	Elev. - MSL	Q - CFS	Elev. - MSL
V	30165	882	1024.8	7800	1028.9
W	32045	882	1031.4	8077	1036.0

<sup>1/</sup> Distance in feet from confluence with Tiffany Creek

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

DISCHARGE - ELEVATION DATA

BEAVER CREEK

TABLE 1



Flooding Source		Discharge - Elevation							
Cross-section	Distance <sup>1/</sup>	10 year		50 year		100 year		500 year	
Boyceville West Drainageway		Q CFS	Elev. MSL	Q CFS	Elev. MSL	Q CFS	Elev. MSL	Q CFS	Elev. MSL
A	290	249	945.3	281	946.6	296	947.0	314	947.6
	340	West Tiffany Street							
B	390	249	946.1	281	946.7	296	947.1	314	947.7
C	620	249	946.2	281	946.8	296	947.2	314	947.7
	670	West Main Street							
D	720	249	946.5	281	947.0	296	947.4	314	948.1
	968	Soo Line Railroad							
E	1057	393	948.3	620	948.8	752	949.0	1004	949.4
	1107	State Highway "170"							
F	1157	393	948.3	620	948.8	752	949.0	1004	949.4
G	1497	393	948.3	620	948.8	752	949.0	1004	949.4
H	1717	393	948.4	620	948.8	752	949.0	1004	949.4
I	2317	393	948.4	620	948.8	752	949.0	1004	949.4
J	2457	393	948.4	620	948.8	752	949.0	1004	949.4
	2706	Field Road							
K	2955	430	948.7	679	949.0	824	949.2	1100	949.5
L	3155	458	949.0	722	949.3	876	949.4	1170	949.8
M	3905	458	950.7	722	951.0	876	951.1	1170	951.4

<sup>1/</sup> Distance in feet from confluence with Tiffany Creek

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

DISCHARGE - ELEVATION DATA

BOYCEVILLE WEST DRAINAGEWAY

TABLE 1

Flooding Source		Discharge - Elevation									
Cross-section	Distance <sup>1/</sup>	10 year		50 year		100 year		500 year			
Boyceville East Drainageway		Q CFS	Elev. MSL	Q CFS	Elev. MSL	Q CFS	Elev. MSL	Q CFS	Elev. MSL	Q CFS	Elev. MSL
A	155	396	940.9	418	942.0	431	942.5	440	943.4		
	250	East Tiffany Street									
B	410	396	944.8	418	945.0	431	945.0	440	945.1		
C	550	396	944.9	418	945.0	431	945.1	440	945.2		
	640	East Main Street									
D	729	396	945.2	418	945.3	431	945.4	440	945.5		
E	869	396	945.3	418	945.4	431	945.4	440	945.5		
	957	Soo Line Railroad									
F	1046	494	947.0	867	947.1	1116	947.2	1560	947.3		
	1164	State Highway "170"									
G	1282	494	947.0	867	947.1	1116	947.2	1560	947.3		
H	1552	475	947.0	833	947.2	1073	947.2	1500	947.3		
	1662	1st Street									
I	1772	475	947.0	833	947.2	1073	947.2	1500	947.5		
J	1882	434	947.0	761	947.2	980	947.3	1370	947.5		
	1949	2nd Street									
K	2016	434	947.0	761	947.2	980	947.4	1370	947.6		
L	2206	380	947.0	667	947.2	858	947.4	1200	947.6		
M	2846	340	948.1	597	948.4	770	948.8	1075	949.0		
N	3446	340	948.5	597	948.8	770	949.1	1075	949.4		

<sup>1/</sup> Distance in feet from confluence with Tiffany Creek

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

DISCHARGE - ELEVATION DATA  
BOYCEVILLE EAST DRAINAGEWAY

TABLE 1



## Appendix F

### FLOODWAY DATA





FLOODING SOURCE		REGIONAL FLOOD			FLOODWAY		
CROSS SECTION	DISTANCE <sup>1</sup>	DISCHARGE (C.F.S.)	WATER SURFACE ELEVATION <sup>2</sup>		WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)
			WITH FLOODWAY <sup>3</sup> (M.S.L.)	WITHOUT FLOODWAY (M.S.L.)			
<u>Tiffany Creek</u>							
A	6160	9217	939.4	939.4	1254	3853	2.39
B	7810	9217	942.5	942.5	517	2683	3.44
C	9690	9217	944.2	944.2	1264	4169	2.21
D	10670	9217	944.9	944.9	1172	3424	2.69
E	10790	9217	946.6	946.6	1333	7644	1.21
F	11800	9217	946.9	946.9	1103	5173	1.78
G	12900	8725	947.3	947.3	1511	4829	1.81
H	13710	8725	948.5	948.5	662	2792	3.13
I	14810	8725	949.1	949.1	1464	7074	1.23
J	15970	8725	950.1	950.1	971	3695	2.36
K	16930	8725	951.5	951.5	880	2848	3.06
L	17760	8725	952.5	952.5	660	2715	3.21
M	18630	8725	953.7	953.7	809	2651	3.29
N	18750	8725	955.3	955.3	860	4329	2.02
O	20700	8725	956.5	956.5	1110	5600	1.56
P	22710	8725	957.7	957.7	1180	4116	2.12
Q	24780	8300	959.9	959.9	1008	2653	3.13

<sup>1</sup>FEET ABOVE MOUTH    <sup>2</sup>WATER-SURFACE ELEVATIONS WITHOUT STRUCTURES IN PLACE    <sup>3</sup>FLOODWAY GENERATED USING FLOOD FLOWS WITH STRUCTURES (DAMS) IN PLACE.

TABLE 1

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

## FLOODWAY DATA

TIFFANY CREEK

FLOODING SOURCE		REGIONAL FLOOD			FLOODWAY		
CROSS SECTION	DISTANCE <sup>1</sup>	DISCHARGE (C.F.S.)	WATER SURFACE ELEVATION <sup>2</sup>		WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)
			WITH FLOODWAY <sup>3</sup> (M.S.L.)	WITHOUT FLOODWAY (M.S.L.)			
Tiffany Creek	(cont)						
R	26040	8300	961.0	961.0	1640	3884	2.14
S	26160	8300	961.6	961.6	2186	4909	1.69
T	28170	8300	963.0	963.0	1985	5379	1.54
U	28290	9300	963.0	963.0	2080	2763	3.00
V	28390	8300	963.6	963.6	2250	3916	2.12
W	32710	8300	966.2	966.2	1050	3148	2.64
X	34460	8300	967.7	967.7	1265	5000	1.65
Y	34560	8300	968.1	968.1	1280	3900	2.13
Z	35740	8583	968.7	968.7	1350	4861	1.77
AA	36670	8583	969.2	969.2	1405	4190	2.05
AB	37910	8583	969.6	969.6	1450	3328	2.58
AC	38960	8583	969.8	969.8	910	2166	3.96
AD	39950	8588	971.1	971.1	1000	2908	2.95
AE	41990	8588	972.2	972.2	1605	4223	2.03
AF	42790	8664	972.8	972.8	1750	4445	1.95
AG	43530	8740	973.6	973.6	1400	3251	2.69

<sup>1</sup>FEET ABOVE MOUTH    <sup>2</sup>WATER-SURFACE ELEVATIONS WITHOUT STRUCTURES IN PLACE    <sup>3</sup>FLOODWAY GENERATED USING FLOOD FLOWS WITH STRUCTURES (DAMS) IN PLACE.

TABLE 1

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

## FLOODWAY DATA

TIFFANY CREEK



FLOODING SOURCE		REGIONAL FLOOD			FLOODWAY		
CROSS SECTION	DISTANCE <sup>1</sup>	DISCHARGE (C.F.S.)	WATER SURFACE ELEVATION <sup>2</sup>		WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)
			WITH FLOODWAY <sup>3</sup> (M.S.L.)	WITHOUT FLOODWAY (M.S.L.)			
<u>Tiffany Creek</u>	(cont)						
AH	45900	8816	974.4	974.4	1300	4114	2.14
AI	46690	8816	975.1	975.1	1363	4087	2.16
AJ	47310	8816	976.1	976.1	1077	3750	2.35
AK	48270	8864	976.7	976.7	2334	8699	1.02
AL	48390	6706	977.9	977.9	2335	8727	0.77
AM	50310	4068	978.4	978.4	1482	2699	1.51
AN	50430	4068	980.7	980.7	1521	6053	0.67
AO	50991	4068	980.8	980.8	1417	4870	0.84
AP	52180	4068	980.9	980.9	2237	5743	0.71
AQ	53520	3450	981.5	981.5	2042	3053	1.13
AR	54845	3450	982.3	982.3	1510	2992	1.15
AS	55485	3450	982.7	982.7	1946	3669	0.94
AT	55645	3450	985.5	985.5	1568	3345	1.03
AU	56485	3525	985.6	985.6	2059	4760	0.74
AV	57430	3600	985.7	985.7	2088	5815	0.62
AW	58830	3675	986.0	986.0	1940	3606	1.02
AX	59670	3750	986.3	986.3	1194	1952	1.92

<sup>1</sup>FEET ABOVE MOUTH    <sup>2</sup>WATER-SURFACE ELEVATIONS WITHOUT STRUCTURES IN PLACE    <sup>3</sup>FLOODWAY GENERATED USING FLOOD FLOWS WITH STRUCTURES (DAMS) IN PLACE.

TABLE 1

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

## FLOODWAY DATA

TIFFANY CREEK

FLOODING SOURCE		REGIONAL FLOOD			FLOODWAY		
CROSS SECTION	DISTANCE <sup>1</sup>	DISCHARGE (C.F.S.)	WATER SURFACE ELEVATION <sup>2</sup>		WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)
			WITH FLOODWAY <sup>3</sup> (M.S.L.)	WITHOUT FLOODWAY (M.S.L.)			
Tiffany Creek (cont)							
AY	59770	3750	987.5	987.5	1457	3901	0.96
AZ	60020	3750	987.9	987.9	763	2172	1.73
BA	60710	3750	989.4	989.4	943	2127	1.76
BB	60885	4125	990.3	990.3	2780	1346	3.69
BC	61236	3918	991.4	991.4	2683	1782	2.20
BD	61641	3918	992.6	992.6	2308	1872	2.09
BE	62096	3918	994.2	994.2	1861	1475	2.66
BF	62493	3918	995.6	995.6	1424	1558	2.52
BG	62553	3918	995.8	995.8	1369	5053	0.78
BH	63143	3918	996.3	996.3	1283	3905	1.00
BI	63693	3918	996.8	996.8	1085	3238	1.21
BJ	63803	3918	997.7	997.7	1155	3970	0.99
BK	64303	3593	997.9	997.9	1040	2812	1.28
BL	65633	3593	998.3	998.3	1017	2283	1.57
BM	66233	3593	999.4	999.4	1038	8642	0.42
BN	66783	3593	1001.1	1001.1	946	1183	3.04

<sup>1</sup>FEET ABOVE MOUTH <sup>2</sup>WATER-SURFACE ELEVATIONS WITHOUT STRUCTURES IN PLACE <sup>3</sup>FLOODWAY GENERATED USING FLOOD FLOWS WITH STRUCTURES (DAMS) IN PLACE.

TABLE 1

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

## FLOODWAY DATA

TIFFANY CREEK



FLOODING SOURCE		REGIONAL FLOOD			FLOODWAY		
CROSS SECTION	DISTANCE <sup>1</sup>	DISCHARGE (C.F.S.)	WATER SURFACE ELEVATION <sup>2</sup>		WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)
			WITH FLOODWAY <sup>3</sup> (M.S.L.)	WITHOUT FLOODWAY (M.S.L.)			
Tiffany Creek	(cont)						
B0	68023	3593	1002.7	1002.7	964	2118	1.70
BP	68683	1350	1003.1	1003.1	792	1231	1.10
BQ	69103	1350	1003.9	1003.9	808	895	1.51
BR	69713	1350	1005.4	1005.4	741	602	2.24
BS	69973	1350	1007.9	1007.9	953	640	2.11
BT	70493	1350	1009.6	1009.6	603	766	1.76
BU	70943	1350	1011.1	1011.1	398	665	2.03
BV	71543	1343	1014.0	1014.0	424	476	2.82
BW	72113	1343	1017.3	1017.3	639	562	2.39
BX	72633	1343	1019.9	1019.9	190	312	4.30
BY	72673	1343	1019.9	1019.9	91	191	7.02
BZ	72773	1343	1021.5	1021.5	420	678	1.98
CA	73323	1343	1022.6	1022.6	460	413	3.25
CB	74883	1343	1025.4	1025.4	376	470	2.86
CC	74353	1343	1028.8	1028.8	217	290	4.63
CD	74493	1343	1030.7	1030.7	52	143	9.37

<sup>1</sup>FEET ABOVE MOUTH    <sup>2</sup>WATER-SURFACE ELEVATIONS WITHOUT STRUCTURES IN PLACE    <sup>3</sup>FLOODWAY GENERATED USING FLOOD FLOWS WITH STRUCTURES (DAMS) IN PLACE.

TABLE 1

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

FLOODWAY DATA

TIFFANY CREEK

FLOODING SOURCE		REGIONAL FLOOD			FLOODWAY		
CROSS SECTION	DISTANCE <sup>1</sup>	DISCHARGE (C.F.S.)	WATER SURFACE ELEVATION <sup>2</sup>		WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)
			WITH FLOODWAY <sup>3</sup> (M.S.L.)	WITHOUT FLOODWAY (M.S.L.)			
Tiffany Creek (cont)							
CE	74593	1343	1032.7	1032.7	362	545	2.46
CF	74693	1343	1032.8	1032.8	289	593	2.27
CG	75143	1343	1033.8	1033.8	215	356	3.77
CH	75743	1343	1036.1	1036.1	111	237	5.66
CI	76103	1200	1038.3	1038.3	80	243	4.95
CJ	76245	1200	1042.2	1042.2	498	713	1.68
CK	76745	1196	1042.9	1042.9	545	1195	1.00
CL	77735	1196	1052.0	1052.0	437	376	3.18
CM	78395	1196	1058.4	1058.4	104	185	6.46
CN	79295	534	1064.3	1064.3	153	151	3.53
CO	79695	534	1069.4	1069.4	643	90	5.90 <sup>c</sup>
CP	79880	333	1071.7	1071.7	499	936	0.36
CQ	80080	333	1072.7	1072.7	327	237	1.41

<sup>1</sup>FEET ABOVE MOUTH    <sup>2</sup>WATER-SURFACE ELEVATIONS WITHOUT STRUCTURES IN PLACE    <sup>3</sup>FLOODWAY GENERATED USING FLOOD FLOWS WITH STRUCTURES (DAMS) IN PLACE.

TABLE 1

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

## FLOODWAY DATA

TIFFANY CREEK



FLOODING SOURCE		REGIONAL FLOOD				FLOODWAY	
CROSS SECTION	DISTANCE <sup>1</sup>	DISCHARGE (C.F.S.)	WATER SURFACE ELEVATION <sup>2</sup>		WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)
			WITH FLOODWAY <sup>3</sup> (M.S.L.)	WITHOUT FLOODWAY (M.S.L.)			
Beaver Creek							
A	1680	3350	977.9	977.9	1312	3604	0.93
B	1900	3350	978.4	978.4	1110	3283	1.02
C	2135	3350	980.1	980.1	694	2099	1.60
D	2605	3520	980.3	980.3	756	2316	1.52
E	3395	3691	980.7	980.7	1300	1982	1.86
F	5935	3863	981.4	981.4	1685	3661	1.06
G	7895	3978	983.1	983.1	1941	2428	1.64
H	10855	4033	986.5	986.5	677	1803	2.24
I	10955	4033	989.2	989.2	858	2963	1.36
J	15095	2247	991.4	991.4	768	1760	1.28
K	17615	1701	993.0	993.0	1156	1457	1.17
L	20135	1668	997.2	997.2	1024	841	1.98
M	20465	1668	1002.0	1002.0	975	2066	0.81
N	21745	1605	1002.5	1002.5	1293	1506	1.07
O	24665	999	1008.3	1008.3	114	216	4.63
P	24965	999	1010.5	1010.5	178	421	2.37
Q	25845	999	1012.0	1012.0	135	227	4.40

<sup>1</sup>FEET ABOVE MOUTH    <sup>2</sup>WATER-SURFACE ELEVATIONS WITHOUT STRUCTURES IN PLACE    <sup>3</sup>FLOODWAY GENERATED USING FLOOD FLOWS WITH STRUCTURES (DAMS) IN PLACE.

TABLE 1

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

## FLOODWAY DATA

BEAVER CREEK

FLOODING SOURCE		REGIONAL FLOOD				FLOODWAY	
CROSS SECTION	DISTANCE <sup>1</sup>	DISCHARGE (C.F.S.)	WATER SURFACE ELEVATION <sup>2</sup>		WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)
			WITH FLOODWAY <sup>3</sup> (M.S.L.)	WITHOUT FLOODWAY (M.S.L.)			
Beaver Creek (cont)							
R	27485	1008	1017.6	1017.6	64	161	6.27
S	27605	1008	1019.3	1019.3	712	1307	0.77
T	27965	882	1019.5	1019.5	478	893	0.99
U	29005	882	1023.1	1023.1	296	332	2.66
V	30165	882	1028.9	1028.9	161	159	5.56
W	32045	882	1036.0	1036.0	223	231	3.82

1FEET ABOVE MOUTH <sup>2</sup>WATER-SURFACE ELEVATIONS WITHOUT STRUCTURES IN PLACE <sup>3</sup>FLOODWAY GENERATED  
USING FLOOD FLOWS WITH STRUCTURES (DAMS) IN PLACE.

TABLE 1

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
GLENWOOD CITY, DOWNING AND BOYCEVILLE  
FLOOD HAZARD STUDY  
ST. CROIX & DUNN CO'S., WISCONSIN

## FLOODWAY DATA

BEAVER CREEK



FLOODING SOURCE		REGIONAL FLOOD			FLOODWAY		
CROSS SECTION	DISTANCE <sup>1</sup>	DISCHARGE (C.F.S.)	WATER SURFACE ELEVATION <sup>2</sup>		WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)
			WITH FLOODWAY <sup>3</sup> (M.S.L.)	WITHOUT FLOODWAY (M.S.L.)			
Glenhaven Creek							
A	in Floodway of Tiffany Creek						
B	995	576	998.7	998.7	1130	2393	0.27
C	1585	555	999.1	999.1	498	910	0.73
D	2235	518	1001.5	1001.5	619	397	1.32
E	2685	463	1004.2	1004.2	269	298	1.58
F	2845	463	1007.4	1007.4	506	578	0.81
G	4105	426	1012.4	1012.4	481	233	1.85
H	4865	352	1015.0	1015.0	302	151	2.37
I	5017	352	1019.5	1019.5	572	1409	0.25
J	5147	296	1019.5	1019.5	509	826	0.36
K	6027	241	1022.1	1022.1	197	66	3.73c

1FEET ABOVE MOUTH 2WATER-SURFACE ELEVATIONS WITHOUT STRUCTURES IN PLACE 3FLOODWAY GENERATED  
 USING FLOOD FLOWS WITH STRUCTURES (DAMS) IN PLACE.

TABLE 1

U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE  
 GLENWOOD CITY, DOWNING AND BOYCEVILLE  
 FLOOD HAZARD STUDY  
 ST. CROIX & DUNN CO'S., WISCONSIN

## FLOODWAY DATA

GLENHAVEN CREEK





Appendix G

INVESTIGATIONS AND ANALYSIS





## Investigation and Analysis

Glen Hills watershed was modeled in the early 1960's. Six-hour duration rainfalls were used to compute runoff, peak flows, and volumes, which in turn were graphically routed through the stream system manually. It was decided to remodel the watershed using the computer program, "Computer Program for Project Formulation, Hydrology - SCS TR 20." The presently accepted 24-hour storm rainfalls were used utilizing the Type II rainfall distribution. All the original subwatersheds were used and all existing structures were flood routed. See table G-1 for a summary of the structure routings. The structures create a 42 percent reduction in the flood peaks at the outlet to the watershed. The 100-year peak flow without the structures is 15,500 cubic feet per second and 9,100 cubic feet per second with the structures in place. Two water surface profiles were run, one with the structures in place and one with the structures removed. The two profiles with their related flood plains were presented to the city, county, and state officials. It was agreed, based on the fact the county has a limited maintenance agreement on the structures, that the flood plain resulting from the floodflows with the structures in place would be regulated as the floodway.

The difference between the flood plain with structures and the flood plain without the structures would be regulated as flood fringe. This would provide protection for the property owners should the dams be removed. The only exception would be the two drainageways in Boyceville where there are no structures to reduce the flooding. The 100-year regional flood plain is shown for these drainageways.

The floodway and flood plains are shown on the photomaps in appendix A. The photomaps also show the location of the valley cross sections, used to generate the water surface profiles plotted in appendix B, as well as the locations of the reference marks used to perform the engineering surveys. The water surface profile elevations were generated using the computer program "WSP2 Computer Program, Technical Release No. 61."

The tabulated values for the floodway are listed in Appendix F.

Structure No.	Principal Spillway Design Frequency and Duration	Antecedent Moisture	Structure Hazard Class Design	Structure Hazard Class as revised	Emergency Spillway Crest Elev. MSL	Top of Dam Crest Elev. MSL	Regional Flood Crest Elev. MSL	Difference* Regional Flood & Emergency Crest ft.	Difference* Regional Flood & Top of Dam ft.
1	25yr 6hr	$\frac{II + III}{2}$	a	a	1115.0	1117.5	1116.2	+ 1.2	- 1.3
2	25yr 6hr	$\frac{II + III}{2}$	a	a	1118.1	1120.8	1119.2	+ 1.1	- 1.6
3	25yr 6hr	$\frac{II + III}{2}$	a	a	1096.6	1099.6	1097.6	+ 1.0	- 2.0
4	41.67yr 6hr	$\frac{II + III}{2}$	$\frac{a + b}{2}$	c	1119.5	1123.5	1120.4	+ 0.8	- 3.1
5	41.67yr 6hr	$\frac{II + III}{2}$	$\frac{a + b}{2}$	c	1099.5	1103.5	1100.0	+ 0.5	- 3.5
6	50yr 1/10 day	II	b	b	1042.3	1046.8	1040.9	- 1.4	- 5.9
7	25yr 1/10 day	II	a	b	1099.5	1102.5	1099.7	+ 0.2	- 2.8
8	25yr 1/10 day	II	a	a	1103.0	1106.5	1103.3	+ 0.3	- 3.2
10	50yr 6hr	$\frac{II + III}{2}$	a	c	1080.0	1090.0	1080.6	+ 0.6	- 9.4
11	25yr 1/10 day	II	a	a	1039.6	1043.6	1040.7	+ 1.1	- 2.9

\* A "+" indicates the regional flood is above the emergency spillway crest elevation. A "-" means the regional flood is below the emergency spillway crest elevation or top of dam.

Table G-1 Summary of Structure Routings



Appendix H

GLOSSARY





## GLOSSARY

### CHAPTER NR. 116, WISCONSIN'S FLOOD PLAIN MANAGEMENT PROGRAM NR. 116.03 DEFINITIONS

Channel. A channel is a natural or artificial watercourse with definite bed and banks to confine and conduct the normal flow of water.

Department. Department refers to the State of Wisconsin Department of Natural Resources.

Encroachment. An encroachment is any fill, structure, building, use, accessory use, or development in the floodway.

Encroachment/Floodway Lines. Encroachment/floodway lines are limits of obstruction to floodflows. These lines are on both sides of and generally parallel to the river or stream. The lines are established by assuming that the area landward (outside) of the encroachment/floodway lines will be ultimately developed in such a way that it will not be available to convey floodflows.

Equal Degree of Hydraulic Encroachment. The effect of any encroachment into the floodway must be computed by assuming an equal degree of hydraulic encroachment on the other side of a river or stream for a hydraulic reach. This computation assures that property owners up, down, or across the river or stream will have the same rights of hydraulic encroachment. Encroachments are analyzed on the basis of the effect upon hydraulic conveyance, not upon the distance the encroachment extends into the floodway. Also see: Hydraulic Reach.

Flood. A general and temporary condition of partial or complete inundation of normally dry land areas caused by the overflow or rise of rivers, streams, or lakes.

Flood Frequency. The term flood frequency is a means of expressing the probability of flood occurrences and is generally determined from statistical analyses. The frequency of a particular floodflow is usually expressed as occurring, on the average, once in a specified number of years. Any particular floodflow could, however, occur more frequently than once in any given year.

Flood Fringe. The flood fringe is that portion of the flood plain outside of the floodway, which is covered by floodwaters during the regional flood; it is generally associated with standing water rather than rapidly flowing water.

Flood Plain. The flood plain is the land which has been or may be hereafter covered by floodwater during the regional flood. The flood plain includes the floodway and the flood fringe.

Flood Plain Management. Flood plain management involves the full range of public policy and action for insuring wise use of flood plains. It includes everything from the collection and dissemination of flood control information to actual acquisition of flood plain lands; and the enactment and administration of codes, ordinances, and statutes for land use in the flood plain.

Flood Proofing. Flood proofing involves any combination of structural provisions, changes, or adjustments to properties and structures subject to flooding, primarily for the purpose of reducing or eliminating flood damage to properties, water and sanitary facilities, structures and contents of buildings in flood hazard areas.

Flood Protection Elevation. The flood protection elevation shall correspond to a point 2 feet of freeboard above the water surface profile associated with the regional flood and the official floodway lines. Also see: Freeboard.

Floodway. The floodway is the channel of a river or stream and those portions of the flood plain adjoining the channel required to carry and discharge the floodwater or floodflows associated with the regional flood.

Freeboard. Freeboard is a factor of safety usually expressed in terms of a certain amount of feet above a calculated flood level. Freeboard compensates for the many unknown factors that contribute to flood heights greater than the height calculated. These unknown factors include, but are not limited to, ice jams, debris accumulation, wave action, obstruction of bridge openings and floodways, the effects of urbanization on the hydrology of the watershed, loss of flood storage areas due to development and aggradation of the river or streambed.

High Flood Damage Potential. High flood damage potential is associated with any danger to life or health and any significant economic loss to a structure or building or its contents.

Hydraulic Floodway Lines. Hydraulic floodway lines shall delineate the channel of the river or stream and those portions of the adjoining flood plains which are reasonably required to carry and discharge the regional floodflow without any measurable increase in flood heights.

Hydraulic Reach. A hydraulic reach along a river or stream is that portion of the river or stream extending from one significant change in the hydraulic character of the river or stream to the next significant change. These changes are usually associated with breaks in the slope of the water surface profile, and may be caused by bridges, dams, expansion and contraction of the waterflow, and changes in streambed slope or vegetation.

Levee. A levee is a continuous dike or embankment of earth constructed parallel to a river or stream to prevent flooding of certain areas of land.

Official Floodway Lines. Official floodway lines are those lines which have been adopted by the county, city, or village, approved by the department, and which are shown on the official flood plain zoning maps and used for regulatory purposes.



Regional Flood. The regional flood is a flood determined to be representative of large floods known to have generally occurred in Wisconsin and which may be expected to occur on a particular stream because of like physical characteristics. The regional flood is based upon a statistical analysis of streamflow records available for the watershed and/or an analysis of rainfall and runoff characteristics in the general watershed region. The flood frequency of the regional flood is once in every 100 years; this means that in any given year there is a 1 percent chance that the regional flood may occur. During a typical 30-year mortgage period, the regional flood has a 26 percent chance of occurring.

Structure. A structure is any manmade object with form, shape, and utility, either permanently or temporarily attached to or placed upon the ground, riverbed, streambed, or lakebed.

Watershed. A watershed is a region or area contributing ultimately to the water supply of a particular watercourse or body of water.

Water Surface Profile. The water surface profile is a graphical representation of the height of the water surface throughout a county, city, or village based upon a certain flow passing through the river or stream. A water surface profile based upon flows occurring during a regional flood is used in regulating the flood plain areas.





## Appendix I

### BIBLIOGRAPHY





### Bibliography and Related References

1. Conger, Duane H., Techniques for Estimating Magnitude and Frequency of Floods for Wisconsin Streams, U.S. Department of the Interior, Geological Survey, Water Resources Division, Madison, Wisconsin, 1981.
2. State of Wisconsin, Blue Book, Wisconsin Legislative Reference Bureau, 1975.
3. USDA, Soil Conservation Service, Computer Program for Project Formulation Hydrology Technical Release No. 20, Washington, D.C., May 1965.
4. USDA, Soil Conservation Service, WSP-2 Computer Program, Technical Release No. 61, May 1976.
5. Shaw & Fredine, 1956. Wetlands of the United States. United States Department of Interior, Fish and Wildlife Service, Circular 39, 67 pages.
6. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climates of the States, Volume I-Eastern States plus Puerto Rico and the U.S. Virgin Islands.







R0000 528090



R0000 528090



SOIL CONSERVATION SERVICE